HONORURU TO HONOLULU: FROM VILLAGE TO CITY

VOLUME II: THE BURIALS



by

Conrad "Mac" Goodwin Michael Pietrusewsky Michele Toomay Douglas Rona Ikehara-Quebral

International Archaeological Research Institute, Inc.

July 1995

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Archaeological Data Recovery Report Marin Tower Property, Site No. 50-80-14-4494 Honolulu, Hawaiʻi

by

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prepared for

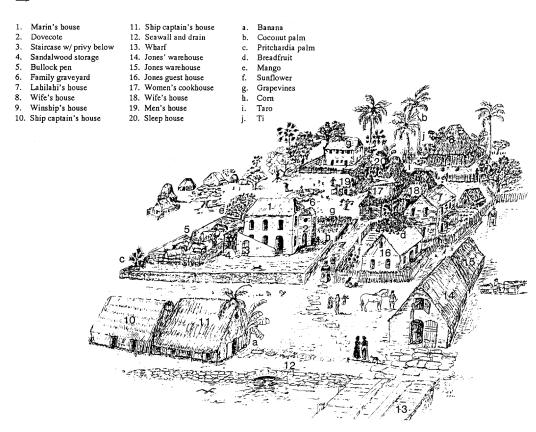
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Cover Sketch: This sketch, drawn by Lydia Mihelič Pulsipher (Professor of Geography, University of Tennessee), in July 1994, is a reconstruction drawing of the house and grounds occupied by Don Francisco de Paula Marin and his ohana (family) in Honolulu, Hawai'i, about 1835. The drawing is based on information from several sources (see sketch sources in references cited). The locations of the principal houses and the Marin family graveyard were plotted on a computer from survey maps in the Land Commission Award (LCA) testimony volumes. Subsequently, the placement of the graveyard, Marin's house, and the seawall and drain was altered to conform with the archaeological evidence. Vasili Golovnin's 1818 map of Honolulu's Harbor provided the basic architectural form for Marin's house. The thatch houses, the stone and stick fences, and bullock pen were mentioned in the LCA testimony; their appearance is derived from drawings of the period; but their precise location is not known from either the written or the archaeological record. The trees and other vegetation are all varieties that were present in Honolulu in the 1830s. The human and animal figures are derived from similar figures in the drawings of the period.

Key



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ABSTRACT

Between March 2 and May 12, 1992, an International Archaeological Research Institute, Inc. (IARII) research team conducted demolition monitoring, an inventory survey, and data recovery operations on the Marin Tower Project Site in downtown Honolulu, Hawai'i. This report documents one aspect of the total project - namely, the 15 human burials and scattered, isolated human skeletal elements that were discovered and excavated, and which were re-interred on the property on March 3, 1994.

Burials are a very sensitive issue for Hawaiians, as they are for many other peoples. There are prescribed legal and ethical procedures in the event burials (expected or unexpected) are discovered during archaeological investigations. In this case, following the wishes of family descendants as well as the legal practice in the State of Hawai'i for reports on burials, this volume is separate from the main archaeological report on the site.

Chapters I-IV contain the project description, a summary of historical context, and a discussion of the archaeological methods and stratigraphy for the burials. Included is a brief description of each of the burials and the associated artifacts, observations of the physical anthropologists, and our conclusions about each of the individuals. These chapters are basically in non-technical language written primarily for the family descendants.

Chapters V-VIII contain the highly technical aspects of the report on the observations of the human skeletal remains. They were prepared by the physical anthropologists. Included is a discussion of the methods and laboratory procedures, approved in advance by family descendants, that were followed for this project. A detailed scientific description of the human skeletal remains follows. The findings indicate that the majority of the individuals are of primarily Hawaiian descent or their ethnicity cannot be determined, and some are of the right age and sex to be related to the Marin family by marriage and/or blood. One male is the right age, and was interred in the right location, to be Don Francisco Marin, but the overall evidence for this individual being Marin is inconclusive.

Appendix A is the Memorandum of Agreement between the Marin family descendants and the City and County of Honolulu regarding the treatment of the burials. Appendices B, C, and D are, respectively, the catalog of artifacts, faunal remains, and shells recovered in direct association with the burials. Appendix E lists the isolated human skeletal remains recovered from disturbed contexts and which could not be joined with any of the 15 individuals.

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I: THE PROJECT

Introduction

On May 12, 1992, an International Archaeological Research Institute, Inc. (IARII) research team concluded archaeological data recovery field operations on the Marin Tower Project Area (Site 50-80-14-4494) in downtown Honolulu. Part of the data recovery included the recording and disinterment of 13 burial features and the remains of several displaced and isolated human skeletal elements. This report brings to a close the results of the archaeological and osteological investigations for the burials that were found on the property.

The complete project proved to be enormous. IARII personnel spent nearly 600 person days on the field operations: monitoring - 20 days; survey - 74 days, and data recovery operations - 484 days. An additional 89 person days were spent disinterring the burials on the property. In the laboratory, cleaning, identification, cataloging, and analysis of artifacts and ecofacts required 570 person days by IARII technicians and specialist consultants. The osteological identification of the human skeletal remains and the associated midden analysis took another 150 person days. The report has taken nearly one year of work time to prepare.

Location

Marin Tower is a 28-story housing project developed by the Department of Housing and Community Development, City and County of Honolulu. In addition to Marin Tower, a six-story parking structure was constructed at the seaward end of the block. Two levels of underground parking were built beneath the site. Marin Tower and its accouterments are on the lower (seaward) two-thirds of a city block within Honolulu's Chinatown (Fig. 1). Honolulu Harbor is to the west just across Nimitz Highway, the city's financial district is a few blocks south, and the principal city and state government centers are slightly further south-to-southeast.

The project area is located in the lot bounded by Maunakea Street to the north, Smith Street to the south, Nimitz Highway on the west with the harbor just beyond, and a series of privately owned businesses along King Street on the east side. These latter buildings include the Liberty Bank Building, the Goodwill Industries Building, and an unnamed building. The structures range in age from 1895 to 1951 (Wanket 1990: 31-34). The land use history of the

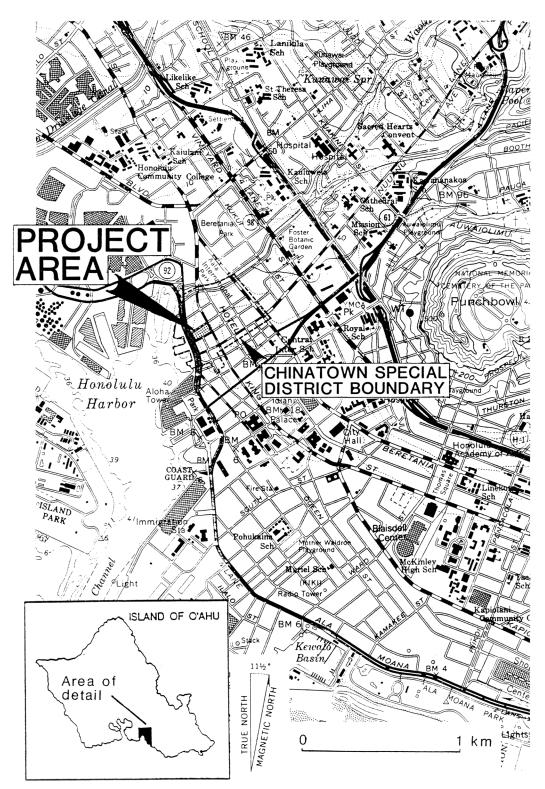


Figure 1. Project area location on USGS map.

project area and environs is presented later in this report; however, in general the area has been host to various private residences and businesses throughout the early 19th century. By the 1860s, Chinese residential occupation was dominant in the eastern half of the site and the western portion was home to the Honolulu Iron Works. These two uses were separated by the extension of Marin Road (sometimes called Marin Alley) across the property. In the 1950s, all buildings remaining on the site were razed to clear the way for the construction of a multi-story parking garage.

Legal Mandate

The property is within the Chinatown Special District (Fig. 1), which was placed on the National Register of Historic Places in January 1973 (Register Number 80-14-9927). Because of this location and under Chapter 6E of the Hawai'i Revised Statutes, an assessment of historical architectural and archaeological resources was mandated as part of the project's environmental impact statement (EIS). The Applied Research Group, Bishop Museum, conducted the initial historical research to determine the likelihood of archaeological resources being present within the project area (Hurst and Cleghorn 1990). Their documentary survey demonstrated intensive use of the property from Hawai'i's early historical period to the present. Don Francisco de Paula Marin, a friend and advisor to Kamehameha I, and John Coffin Jones, the first U.S. trade representative and consul to the Kingdom of Hawai'i, had interests on this land; both individuals are significant in Honolulu's history. Marin and some of his descendants reportedly were buried on the property. Subsequently, the tract housed part of the Honolulu Iron Works, early Chinese immigrants and businesses, and a variety of other uses reflecting different periods of growth and development of the city. Prehistoric remains, too, were likely to be present beneath the historical deposits, but discovery of their presence would have to wait until subsurface Arguing that archaeological resources related to these diverse land uses are important in the history and development of Honolulu, the Applied Research Group recommended that an archaeological inventory survey be conducted to determine the character, extent and integrity of cultural remains in the project area. The State Historic Preservation Division concurred and, soon thereafter, Architects Hawaii, the development's manager for the City Department of Housing and Community Affairs, issued a request for proposals (RFP).

IARII's Role

IARII responded to the RFP in December (Athens 1991). Two months later (February, 1992), Architects Hawaii notified IARII that it had been selected to conduct the archaeological inventory survey and, if warranted, archaeological data recovery operations for the Marin Tower Project. Initial work involved (1) monitoring the demolition of the subsurface features for the existing parking structure and old Brewer & Co. warehouse between March 2-11 (Moblo and Goodwin 1992), and (2) conducting sub-surface testing in order to locate, document, and evaluate archaeological remains within project boundaries. IARII archaeologists conducted the intensive inventory survey from March 12 to March 31, 1992. In the interim report and mitigation plan proposal (Goodwin and Burtchard 1992) and

addendum (Burtchard et al. 1992), IARII advised the client that the site contained a wide range of significant and intact archaeological resources, including human burials, that would be adversely impacted by the proposed construction. The report also included our recommendations and procedures for historical research and data recovery operations to mitigate the adverse impact.

After receiving approval for the mitigation plan in early April, IARII then initiated archaeological data recovery operations, completing them on May 12 (Goodwin 1992). Following fieldwork, the research team conducted a variety of different investigations on: the historical development of the block; artifacts and other materials that they recovered; and, followed the covenant made between the Marin family descendants and the City's Department of Housing and Community Development (Memorandum of Agreement 1992), on the human burials that IARII reluctantly and respectfully disinterred (Goodwin, Pietrusewsky, Douglas and Ikehara 1992).

Terminology

Throughout this report we use some Hawaiian words, set in italics, because they have embedded within them meanings that convey, at least partially, some of the depth, richness, and concepts that Hawaiians have about their islands and the ways they have chosen to think about and to live on and among them. In these instances, the definitions for the Hawaiian word is given the first time the word is used; but if the word is employed sparsely, we may provide the meaning a second or third time. Even though this is a technical report on archaeological findings, our intent for this use of Hawaiian terminology is to begin to introduce the reader, especially one not familiar with Hawaiian culture, to the unique ways that Hawaiians perceive and adapt to the world they inhabit. Three words that we frequently employ, for example, are *ohana*, *mauka*, and *makai*.

In the simplest sense, *ohana* means family and includes all members of a household or land holding, whether related by blood or not, whether under one roof or many, whether chief or commoner, who live and work together in a system of mutual supports, rights, and obligations. On this project, for example, the Marin *ohana* includes not only the immediate genetic relatives of Don Francisco and his wives and their kin, but also servants and workers who lived and were employed within the property bounds.

Mauka and makai are a pair of words that refer, respectively, to the mountains and the sea. On an irregularly shaped island in the vast Pacific where visibility is interrupted by high, jutting cliffs and peaks, location of a place with respect to the seacoast or to the mountains conveys a better sense of direction for Hawaiians than do cardinal points like north or east. For the Marin Tower property, we might refer to King Street as being at the mauka end of the block, or the side closest to, or facing, inland and the mountains. Conversely, Don Francisco built his guest houses along the shore makai of his own house, which was centered on the property.

Field Procedures and Methods

While some members of the IARII archaeological team monitored demolition of the existing structures and removal of the buildings' footings, another group of the IARII research staff re-scaled the ca. 1848 Land Commission Award map of the Marin property and plotted the location of Don Francisco's house and the family burying ground on a modern city block map (Fig. 2). Changes in street widths, corners and buildings as Honolulu developed unfortunately prohibited us from plotting their precise location in advance. In addition, the IARII team also re-scaled and plotted 19th and early 20th century fire insurance maps of the property onto the modern street maps in order to learn as much as possible about the changes that occurred on the property following Don Francisco's death in 1837.

During the intensive archaeological survey phase of the project, 20 test trenches (Fig. 3) were excavated with a backhoe under careful supervision of the IARII archaeologists. Two test trenches (TT7 and TT8, Fig. 3) were placed in the immediate vicinity of the family burial ground and human skeletal remains were found in TT8. We now knew that there was at least one burial present in the immediate vicinity of the plotted Marin cemetery. We designated this area as Block II, immediately stopped testing, and notified the State Historic Preservation Division.

In another part of the property, we unexpectedly discovered additional human skeletal remains in Test Trench 6 in a fairly deep (for this site) soil stratum. This test trench and an adjacent one, TT1 (Fig. 3), also revealed numerous, complex, and highly significant archaeological features and soil strata from many different time periods. This area was designated as Block I. These two areas (Blocks I and II) were the only locations where burials were discovered.

After we learned that burials were present, notified the appropriate agencies and assessed the archaeological potential and significance of the property as a whole, we prepared a mitigation plan. Within this plan, we recommended excavation of only enough soil around the burials to allow us to determine the number and placement of the burials such that we could prepare a map of their location without exposing the skeletal remains themselves. Decisions regarding the treatment of the burials subsequently would be made by family descendants in concert with the Oahu Burial Council and the State Historic Preservation Division. For Block II, we initially proposed examining 80 square meters; in the end, however, we expanded our original estimate to 116 square meters in Block II to insure that all the remains were located. Block I originally consisted of 120 square meters recommended for data recovery; here, too, we expanded our estimate to 148 square meters, both to insure location of all the human skeletal remains and to recover data from the myriad other features in Block I. Our concern in this report, however, is only with burials. The subsequent volumes on the Marin Tower project contain the information on the other features and their relationship, if any, with the burials.

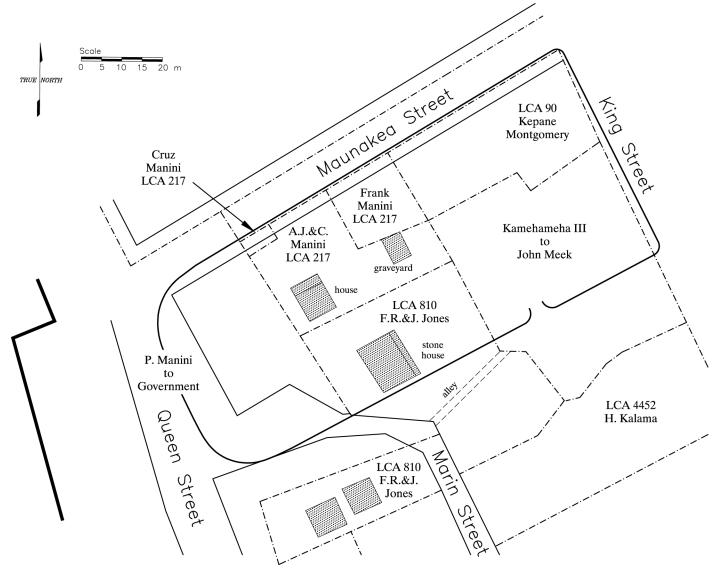


Figure 2. ca. 1848 Land Commission Awards. Marin's house and family graveyard are in LCA 217. The house of his daughter, Lahilahi, was next door in LCA 810.

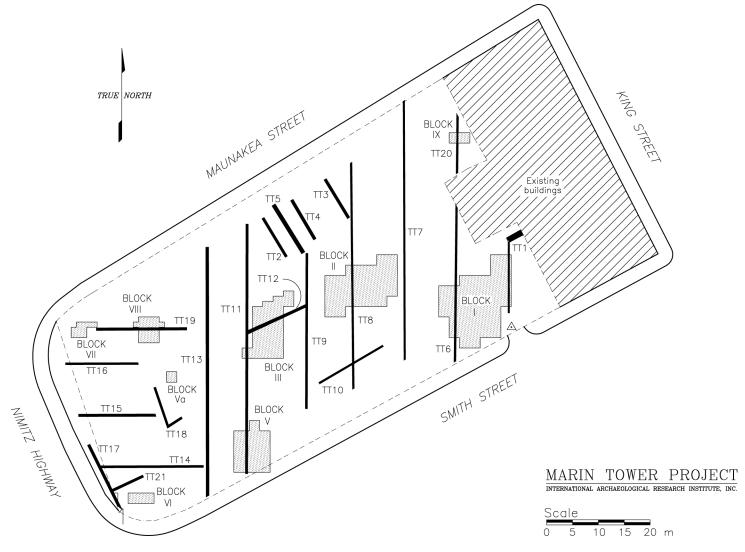


Figure 3. Marin Tower project area. The survey test trenches are labeled TT. The numbered excavation units are within data recovery blocks.

Prior to any further work, *Kahu* Tyrone Reinhardt, a Hawaiian religious practitioner and Protestant clergyman, blessed the two burial locations. The initial step during data recovery operations for Blocks I and II was the removal of the two substrate layers immediately beneath the asphalt parking surface. Stratum A was a gravel and/or crushed coral layer varying between 10-20 cm in thickness. Beneath that lay Stratum B, a layer of compacted basalt, coral, destruction debris (from buildings that preceded the parking garage), and clay. Over most of Blocks I and II, these two layers were machine stripped by backhoe with a straight-edged, non-toothed bucket; in some areas, only the top few centimeters of Stratum B were removed by machine. This technique proved very successful in removing the substrate without disturbing lower soil strata and left us with a smooth, flat, clean (albeit very hard because of the compaction by years of automobile travel on the asphalt) surface. With shovel and hand trowelling, the final remnants of Stratum B were removed.

In Block I, soil stains marking the burials and other features now became visible in Stratum C (the sterile yellowish-brown, silty sandy subsoil that covered much of the site). The initial assessment of the soil stains was that at least six and possibly seven burials were present in Block I. In Block II, no soil stains marking burials or other features were visible, but the location of human skeletal remains from at least six individuals and several isolated skeletal elements were found in a disturbed matrix dominated by the Stratum C subsoil. A map showing the location of the soil stains and the skeletal remains was prepared.

When these tasks were accomplished and maps prepared, we presented our findings to Oahu Burial Council and to Marin family members, and sought their guidance as to how next to proceed. After much discussion, a Memorandum of Agreement (MOA) was prepared This agreement states explicitly the goals of archaeological disinterment of the burials, the specific procedures to be followed by the archaeologists and physical anthropologists in the field and in the laboratory, and the particulars for reburial and protection in perpetuity on the Marin Tower property. Representatives from the family and the City and County of Honolulu signed the MOA on May 5, 1992. A copy of the MOA is included as Appendix A. With this agreement, the IARII archaeologists were given permission to disinter the burials.

Large canopies were erected over the burial locations to protect the remains from the sun and the elements. Prior to starting actual disinterment, final blessings for the remains and for the crew were conducted by *Kahu* Reinhardt and by Monsignor Francis Marsland. After reminding the team one last time about proper respect for the remains, the procedures to follow, the ban on photography and other wishes of the family, work commenced.

The skeletal remains had been located and defined. The general disinterment procedures were as follows. The soils immediately around each burial or skeletal element were carefully removed. This earth was sifted through 1/4", and then 1/8", wire mesh to insure that all artifacts and any very small fragments of displaced bone were recovered.

The 'iwi (the human skeletal remains) and the artifacts around them were left in place while they were drawn to scale. These drawings show the top of the grave shaft soil

stain in a dashed line and the bottom of the excavation (or coffin size) in a solid line.¹ The 'iwi then were removed, wrapped temporarily in plain white paper, placed in bags labeled with provenience (location) information, and finally in specially constructed wooden boxes for transport to the IARII laboratory. Once there, the laboratory procedures detailed in the MOA were followed; they are presented in Chapter V.

After the physical anthropologists made their observations on the remains, IARII prepared a preliminary report (Goodwin, Pietrusewsky, Douglas, and Ikehara 1992) primarily for the family members. Copies were provided to the Oahu Burial Council and to the Hawai'i State Historic Preservation Division (SHPD) for their information and review. The SHPD Administrator had some helpful comments that clarified some points and cleared up two discrepancies on figures (Hibbard 1993); his suggestions have been incorporated in this document.

Then, on May 8, 1993, A. Keanuiueokalaninuiamamao DeSoto, John DeSoto, Larry and Loureen Zdvoracek, Alice Santos, Valdemar Myhre, Laura Manuel, Katherine Lopes, and April Garcia (all Marin family descendants); John Reid (Project Officer for the Department of Housing and Community Development); Bert Yumol and Alan Atkinson (project architects, Architects Hawaii); Glenn Kajiwara (landscape architect, Miyabara & Associates), and Mac Goodwin (IARII Project Director) attended a meeting to discuss the preliminary report and the final arrangements for reburial of the remains on the Marin Tower property. The report was accepted by the family descendants. Dr. Goodwin indicated that the final report would include a lot more technical detail derived from the osteological observations as well as a catalog of the artifacts and related materials that were recovered with the burials. Details for the reburial were discussed and agreed upon by those present. The family wishes those details to remain confidential to afford a degree of protection for the human remains.

In September, 1993, IARII osteologists wrapped the remains and associated materials, placed them in the wooden containers, and, as had been agreed, released them to the care of the City and County of Honolulu for final arrangements. On March 3, 1994, the remains of these individuals were reinterred on the property in an appropriate ceremony presided over by members of Hui Malama and by a Roman Catholic priest. Family members and a few other invited guests attended the ceremony.

These drawings appear below as part of the discussion for each individual. Please note that references to right or left side of any given individual are always from the individual's perspective, not from the viewer's or reader's. For example, a ring on the right middle finger means just that; it was found on the middle finger of the individual's right hand.

Land Use Summary²

Don Francisco de Paula Marin, often known as Manini, reportedly was born in Jerez, in the Andalusian region of Spain, November 28, 1774. He served in the Spanish Navy as a young man and in ca. 1790 was in a colonial outpost on Nootka Sound in northwest coast of the North American continent. He deserted this post and found his way to Hawai'i in 1793 or 1794 and shortly thereafter became a servant, friend and advisor to Kamehameha I. He eventually became a very influential figure in early Honolulu.

Don Francisco built his house and several ancillary structures in ca. 1810 on the land granted for his use by Kamehameha I, near what is today the center of the project area. One of the ancillary features seems to have been a family burying ground, identified as a vault (or tomb) by Gast and Conrad (1973: 132-135) and on the Land Commission Award survey plat map (Fig. 2).

Members of the Marin family continued to live on the property for several years after Don Francisco's death. Frank Manini claimed the property in 1846 and was awarded a portion thereof. Three of Maria Lahilahi's children - John, Rosalie, and Francis, were awarded portions as was Paul Manini (Fig. 2). In the years following, the lots were gradually sold to various interests.

The Honolulu Flour Mill erected a 3-story building at the corner of Maunakea and Queen Streets; it caught fire in 1860 and burned several adjacent buildings. Marin's house and the family burying ground seem to have been lost at this time. By the 1870s, the Honolulu Iron Works had spread over the lower half of the property. Various small businesses with upper story residences fronted King Street, and they had warehouses and other support structures behind them that extended into the project area. A few wooden single-story Chinese stores fronted the *mauka* (toward the mountains) half of Maunakea Street. In April, 1886, a fire damaged the northern half of the block all along King Street down nearly to Marin Street. Then, on January 20, 1900, on the recommendation of the Sanitary Commission a fire was set deliberately in Chinatown as part of an effort to eliminate bubonic plague. The fire soon got out of control and destroyed several Chinatown city blocks. On the project block, the wooden buildings along Maunakea Street burned, but the rest of the block remained relatively untouched.

In 1897 C. Brewer & Co. built (on a concrete slab) a two-story brick warehouse that fronted Queen Street, now Nimitz Highway. This building survived the fire three years later, was extensively remodeled and fire-proofed in 1940, and remained standing serving as restaurant and bar until this project began. An auto stand and repair shop fronted Maunakea Street in the center of the block by 1914, and another gas station faced Smith Street opposite Marin Street by 1927. Several storage sheds and small warehouses extended into the project area behind the King Street businesses. Then in ca. 1950, the city built a two-story parking garage on the middle part of the block between the Brewer Co. building along Queen Street

A detailed land use history of this property is presented in Volume I.

and the King Street businesses. The parking garage and the Brewer Co. building were demolished in early Spring of 1992 as the first stage of construction for the new Marin Tower building. After the superstructures were removed, under the direction and careful monitoring of IARII archaeologists, the concrete slab and parking garage footings were removed. As a last step, the parking surface asphalt was stripped from the site.

The Marin Family

Gast and Conrad (1973) present the details of Don Francisco's life. In this sketch the focus is on information that was assembled to aid possibly in the identification of some of the burials. Marin died in Honolulu, October 30, 1837. The funeral took place the following day, and his body was temporarily placed in the house of Cruz Maughan, his daughter, until a tomb was built on his land. He was interred in the tomb, November 7, 1837 (Gast and Conrad 1973: 3, 35-36, 132-135).

Although a Spaniard and a Roman Catholic, Marin was not an avid practitioner of his faith during the early part of his life; in his later years as his health began to fail, however, he began sessions of prayer at home. He apparently gave all or most of his family rosary beads and required them to participate in the prayer sessions, often twice a day. (Gast and Conrad 1973: 119).

We know only a little about Marin's health. He was reputed to drink a lot, although he states in his diary that he was drunk only four times (Gast and Conrad 1973: 24). He was in ill health in his later years (Gast and Conrad 1973: 15). For example, in August, 1819, he suffered with a dietary problem and apparently passed a kidney stone a few days later (Gast and Conrad 1973: 73-74). He seems to have had kidney problems during the last 20 years of his life (Gast and Conrad 1973: 132). There was a serious outbreak of "the cough" in Honolulu during the early months of 1820, and Marin caught the disease (Gast and Conrad 1973: 76). The cough probably was tuberculosis (Bushnell 1993: 241).

He had four wives of record and fathered numerous children (Gast and Conrad 1973: 23). They are listed in Table 1. Haiamaui apparently was Don Francisco's first wife. She was a high chiefess from the Waipi'o Valley of Hawai'i (Gast and Conrad 1973: 137). Haiamaui may have died July 19, 1811, for the record indicates an unidentified wife of Marin died then (Gast and Conrad 1973: 31, 138); his diary indicates that on "16 August. They threw away the bones of Marin's wife" (Gast and Conrad 1973: 200).

Caquerua apparently became Marin's second wife - on August 7, 1811 (Gast and Conrad 1973: 31). Caquerua seems to have died shortly after 1813 for Marin lived on Hawai'i Island with his wife and daughter Maria for a time during that year. There is, however, no record of Caquera's death. It may be that Haiamaui and Caquerua were the sisters mentioned by Cox. Ross Cox, who visited Honolulu briefly in 1812, wrote of meeting Marin

Mr Maninna ... had built a handsome stone house, the only one on the island, in which he resided with his wife, who was the daughter of a chief. Her sister also lived in the same house; and the busy tongue of scandal, which even here has found an entrance, did not hesitate to say that the two sisters equally participated in his affections (Cox 1957: 31).

If what Cox writes is true that there were two sisters sharing Marin's affections during Cox's 1812 visit, then either the accounts of Haiamaui's death in 1811 are wrong, or Caquerua had a sister whose name we do not know. Cox indicates that Marin's wife was daughter of a chief; is this the chiefess, Haiamaui? It is not clear for Cox does not name Marin's wife. Further, if Caquerua is Haiamaui's sister, then she too would have high *ali'i* (chiefly) status. Edgar and Jane Stewart, the editors of the 1957 version of Cox's book, point out weaknesses in Cox's account, indicating it was written nearly 20 years after his visit to Hawai'i from memory, that Cox had some confusion with his dates, and that he relied on hearsay (Cox 1957: xxxi-xxxii).

Kaihikuloa and Kaualua were Marin's last two wives and apparently also were married to him at the same time. Both of them were too young to have been married to Marin in 1812. Before 1820, however, these two women bore at least one child fathered by Marin. Apparently they continued to bear Marin's children into the 1830s. Antoinette was born in 1832, and John, George, and Olina were born in the years after 1830. One of Marin's wives, who is unidentified, died in October, 1833 (Gast and Conrad 1973: 138).

Haiamaui and Marin had a daughter, Maria Lahilahi, born January 27, 1811. She married John Coffin Jones on August 6, 1827, by whom she had three children who survived past childhood - Huanu (John Coffin Jones III), Rosalie, and Francis (died 1850) - (Gast and Conrad 1973: 34). They apparently had a son, perhaps as early as April, 1828, who was baptized September 14, 1828. This child died December 26, 1828 (Gast and Conrad 1973: 119). Maria Lahilahi died 1844, and may have been buried in the family burying ground.

"DIED

On Monday, Oct 30th, at twelve o'clock, Don Pablo Francisco Marin, aged 64yrs. Don Marin came to these islands in 1793 or 1794. He was a native of Old Spain. His religion was that of the Catholic church. In his belief and in his profession, he was a Catholic; many of his children, as report says, he educated to the Catholic faith,--the creed he professed" (Excerpt from his obituary, *Sandwich Island Gazette* 1837:3).

Don Francisco died in intestate in 1837, and it seems that many of his younger children were taken in by Maria Lahilahi (then 26) and another daughter, Cruz Maughan who was 19 at the time (Gast and Conrad 1973: 138). In 1837, Frank Marin was 14, Paul Marin was 13, Maria Camila was 14, Antoinette was 4 (Gast and Conrad 1973: 137).

Table 1 presents Marin family members who are likely to have been buried within the project area - either in the family burying ground (Block II) or elsewhere (Block I). The likelihood of being included is based on inferences from various documentary sources, primarily Gast and Conrad (1973). For example, Marin writes in his diary in 1821, "30 August. This day I buried my daughter Francisca in my land within the fence" (Gast and Conrad 1973:254). The "shaded" individuals are unlikely to have been buried on the property because they were still alive after 1850, when the property began to be divided. For a few individuals, there is no information regarding their death. An additional relevant observation comes from F.J. Halford (1954:306), who notes that private burial plots were prohibited in Honolulu after 1840. Thus, the written record indicates the only known burials on the lot have to date between ca. 1810 and ca. 1840.

Table 1. The Early Marin Family.

Name	Relation	Sex	Mother	Born	Died	Notes
Don Francisco	Father	M		11-28-1774	10-30-1837 63 at death	Spanish, had kidney problems for last 20 years.
Haiamaui	Wife	F		unknown	7-19-1811	1st wife. Her bones thrown away 8/16 (Gast and Conrad 1973: 200).
Robert Richar[d], or George	son	M	unknown, probably Haiamaui	12 1800	April 1832	Assassinated and buried on Uvea
Micaela	daughter	F	unknown, probably Haiamaui	10-22-1796	unknown	
Camila	daughter	F	unknown, probably Haiamaui	41798	unknown	
Maria (Rahikahi) Lahilahi	daughter	F	Haiamaui	1-27-1811	1844 33 at death	m. John Coffin Jones, 8- 6-1827
unnamed	grandson	M	M. Lahilahi	91828 ?	12-26-1828	less than one year
Huanu	g. son	M	M. Lahilahi	1835	1865-no children	also named John Coffin Jones III
Rosalie	g. daughter	F	M. Lahilahi	1832	after 1861	
Francis	g. son	M	M. Lahilahi	1830	1850	20 at death
Kaihikuloa	wife	F		1803	unknown	Catholic name: Kahokoloa, Maria Guadaloupe
Maria Cruz	daughter	F	Kaihikuloa	1818	unknown	m. Capt. Joseph Maughan
Elizabeth	g. daughter	F	Maria Cruz	after 1834	unknown	m. John F. Colburn
Joseph	g. son	M	Maria Cruz	after 1834	1859	
Frank Paul	son	M	Kaihikuloa	1823	8-4-1867	m. Kalai
Emmanuel	son	M	Kaihikuloa	1825	unknown	
Urbano	son	M	Kaihikuloa	1827	unknown	baptized 11-30-27
Jacob	son	M	Kaihikuloa	1830	unknown	
Antoinette	daughter	F	Kaihikuloa	1832	10-3-1905 in Santa Cruz, Ca.	also, Akoni. m. Lyman Swan in 1851, had three children.

Table 1. (cont.)

Name	Relation	Sex	Mother	Born	Died	Notes
George	son	M	Kaihikuloa	after 1830	1868	
John	son	M	Kaihikuloa	after 1830	unknown	
Nicholas	g. son	M		unknown	unknown	son of John
Kaualua	wife	F		1799	unknown	Catholic name: Kahuela, Maria Antonia
Maria Joanna	daughter	F	Kaualua	1819	unknown	
Maria Anna	daughter	F	Kaualua	1820	unknown	
Maria Camila	daughter	F	Kaualua	21823	1841	m. Capt. Geoffrey Rhodes 12-14-1840, buried in old Catholic cemetery with a child
Paul Francis	son	M	Kaualua	1825	5-8-1869	m. Haupa
Haupa	g. daughter	F	Haupa	unknown	unknown	father, Paul
Frank K. Manini	g. son	M	Haupa	unknown	unknown	father, Paul
Nicholas	son	M	Kaualua	1827	unknown	
Olina	daughter	F	Kaualua	after 1830	unknown	also, Ellen; m. Antonio Manuel
Manini	g. son	M	Olina	unknown	unknown	
Caquerua	wife	F		unknown	unknown	Marin took her wife in Aug. 1811, just after Haiamaui died
unnamed	son	M	unknown, probably Caquerua	4-28-1813	unknown	Kaualua was 14, Kaihikuloa was 11
Isabella	daughter	F	unknown, probably Caquerua	1814	8-7-1814	
unnamed	daughter	F	unknown, probably Caquerua	1815	unknown	diary says Jul. 16
unnamed	son	M	unknown	1816	unknown	
unnamed	daughter	F	unknown	21821	unknown	This is probably Francisca, who was baptized and then died, Aug. 28, 1821.

II: THE BLOCK I BURIALS

IARII archaeologists defined seven roughly rectangular soil stains (features) with rounded corners in Block I during the intensive survey and initial data recovery operations (Fig. 4). These features, upon excavation, turned out to be grave shafts dug into sterile subsoil (Stratum C) for coffin burials. Each soil stain was given a unique feature number; the provenience is presented in Table 2.

* * * * *

Table 2. Burials in Block I.

Individual	Sex	Age	Fea.#	Excavation Units	Notes
I0002, extended	F	40-50	9	34, 35, & 36	A coffin burial. The disarticulated remains of another individual, I0011, had been placed inside the coffin on the right side of the head. See also I0012, below.
10011	?	2-4	9	34, 35, & 36	A disarticulated bundle burial inside the coffin at the head of I0002.
I0012, newborn or stillborn	?	8.5-9 lunar mos.	9a	36	A coffin burial interred separately at the foot of 10002.
I0003, extended	M	19-35	8	33 & 37	A coffin burial.
I0004, extended	?	15	6	32 & 88	A coffin burial.
I0009, extended	M	40-50	5	32, 88, 89, & 100	A coffin burial.
I0010, extended	F	40-50	7	32, 33, 38	A coffin burial.
10016, extended	F	35-40	10	34, 36, & 37	A coffin burial with arms flexed and newborn infant over pelvis region.
I0017	?	9-10 lunar mos.	10	34, 36, & 37	A newborn or stillborn infant interred in the coffin at pelvic region of I0016.

MARIN TOWER BLOCK I TEST TRENCH FEA. 1 -I0011 FEA. 9 0 I0012 10016 10017 10003/ I0004 TEST TRENCH 10009 FEA. 3 FEATURE BURIAL OUTLINE

Figure 4. Plan view of Block I burial features (in solid outlines) and individuals. The dashed lines outline non-burial features.

ROCK

Feature 9 and Feature 9a

Feature 9 is a grave shaft that inadvertently was truncated by Test Trench 6 (Fig. 5); its original size is estimated to be 160 cm (5'3") northeast-southwest, or *mauka-makai*. It averages 50 cm (19.7") wide. The average depth of the fill sediment from the top of the feature to the top of the skeletal remains is 17 cm (6.7"). The coffin is about 6" shorter than the grave shaft. The sediment matrix is a fairly compact, brown sandy silt with a moderate amount of pebble-sized coral fragments, abundant *'ili 'ili* (small, rounded, waterworn stones traditionally used by Native Hawaiians to level surfaces for walking, sleeping, etc.) and scattered charcoal bits. Several coffin nails and some glass fragments were present in the grave shaft fill.

Feature 9a is a grave shaft inadvertently truncated by Test Trench 6 (Fig. 5); its original size is estimated to be 72 cm (28") northeast-southwest, or *mauka-makai*, and is 25 cm (nearly 10") wide. The average depth of the fill from the top of the feature to the top of the skeletal remains is 17 cm (6.6"). The sediment matrix is a fairly compact, brown sandy silt with virtually no coral fragments or *'ili 'ili*. A few coffin nails were present in the grave shaft fill.

Two individuals were interred in the Feature 9 coffin, apparently at the same time. The extended skeleton, I0002, is a female who was between 40-50 years of age at her death. She had been placed on her back in the coffin, and was buried with her head at the *mauka* end of the shaft. Her height is estimated to be 5'4". Although not well preserved, her skeletal remains are relatively complete. Several indicators of physiological stress suggesting a childhood disease, nutritional imbalance, and/or iron deficiency anemia were noted. Dental health at the time of death was poor. Other osteological features suggest possible Hawaiian ancestry. Other than several coffin nails surrounding the skeleton, no artifacts were found in direct association with this individual.

A secondary burial, I0011, was a child, between 2-4 years of age, placed in a bundle at the top right of the female's head. Sex could not be determined. The teeth exhibited enamel hypoplasia caused by some form of stress, possibly a nutritional imbalance and/or disease. A copper pin (Photo 1) was found associated with this individual.

A newborn (or stillborn) infant, I0012, about 9 lunar (pre-birth) months of age, was interred in a separate coffin (Feature 9a) at the foot of Individual I0002. The infant was on its back with head *mauka*, but the remains are very incomplete and fragmentary. A few coffin nails and a coffin wood fragment were recovered during disinterment.

The principal artifacts associated with I0002, I0011, and I0012 include:

(1) a copper alloy, wound head straight pin (Photo 1) found adjacent to I0011. It is quite possible this pin was used to fasten a cloth wrapping around the 'iwi of this child. The pin is a common type that has been

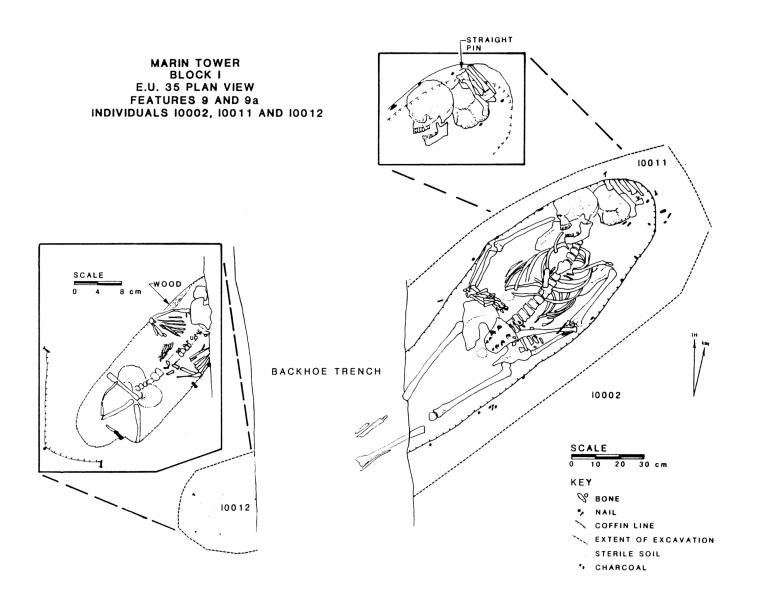


Figure 5.

found on the mainland in archaeological contexts that date from the 17th century to ca. 1824 (Nöel Hume 1978: 254).

- (2) three complete iron coffin nails (Photo 2) and fragments of others that seem to have been cut³ provided an indication of the coffin size and shape. These nails are the principal diagnostic artifacts associated with the skeletal remains and date to ca. 1820. These coffin nails are more than twice the size of those in Photo 3, reflecting the difference between an adult's coffin and one for an infant.
- (3) three fragments of a green glass case bottle that possibly was blown in a mold. Case bottles were first made in two-piece molds in ca. 1820 (McKearin and McKearin 1962: 16).
- (4) a clear metal bottle glass fragment with a two-piece mold seam down the shoulder and body. This seems to be a flask or bitters bottle shape.
- (5) a fragment of clear pressed glass with a smooth surface that probably was made after 1850. This and the previous bottle glass fragment probably were produced 20-30 years after the previously mentioned artifacts. They are most likely intrusions into the fill as a result of the ca. 1950 electric utility trench that cut through the grave shaft.

I0012 had three small iron coffin nails, machine cut, associated with it (Photo 3); one appears to have a machine cut head; hence their manufacturing date is ca. 1830.

Interpretation

It is probable that female I0002 is the mother of the child I0011 interred in the same coffin as a possible bundle (a distinctly Hawaiian tradition, Bowen 1974: 146) and infant I0012 (because the infant was buried at her feet - a common practice in Christian burials). It is also probable that the infant was buried somewhat later than the mother because the coffin alignments are slightly different and the grave shaft fill is different. The coffin nails for the mother's coffin indicate a post-1820 date while the coffin nails of the infant's suggests ca. 1830.

Cut nails were apparently first produced on the East Coast of the United States in ca. 1790; they were cut by a machine from sheet iron; the heads of these first machine-made nails were still hammered by hand until ca. 1815, when they too were cut by the machine. Further refinements in manufacturing technique were made after ca. 1820 that left distinct machine-made scars on the metal which, if the corrosion is not too bad, permit the archaeologist to make more accurate interpretations for this type of artifact (Noel Hume 1978: 253).



Photo 1. Copper straight pin.



Photo 2. Iron nails from adult's coffin.



Photo 3. Iron nails from child's coffin.

* * * * *

Feature 8

Feature 8 is a grave shaft intruded through by a ca. 1950 electric line pipe trench (Fig. 6); it measures 200 cm (6'6") northeast-southwest, or *mauka-makai*, and averages 78 cm (30.5") in width. The average depth of the fill from the top of the feature to the top of the skeletal remains averages 28 cm (11"). The grave shaft fill was a light brown silt with large quantities of *'ili'ili*. A coffin stain was evident near the base of the excavation, and the soil under the skeletal remains was slightly darker and contained some coffin wood fragments. Four basalt flakes and some ceramic sherds were also in the fill.

A young adult male, designated I0003, between 19-35 years of age, was interred in the coffin, 175 cm (nearly 5'9") in length, in this feature (Fig. 6). Approximately 5'8" tall, he was on his back with his head at the *makai* end of the shaft. Facets on the knee joints indicate he was flexing his knees regularly in a rather extreme fashion, as in habitual squatting. Some long bones show signs of an infection, possibly syphilis. Minimal osteoarthritis was observed. His four lower incisors had been intentionally removed before his death. His remaining teeth exhibit some childhood physiological stress, but they are generally healthy.

Artifacts associated directly with the individual include dozens of multi-colored glass seed beads found around the left side of the neck (Photos 4 and 5) and probably were from a necklace rather than article of clothing, given the absence of buttons or other types of clothing fasteners. These beads, all under 2 mm in diameter, are similar to seed beads from a Spanish site in Florida which were dated to between 1780-1800 (Deagan 1987: 173, 179-180). A copper alloy ring with a silver wash (Photo 6) was on the middle finger of the right hand.

In addition to the ring and beads, there were numerous *'ili'ili* and one (1) blue transfer printed pearlware sherd, ca. 1820 (Miller 1991: 9) in the grave shaft fill. Several iron cut nails (post-1820) and nail fragments surrounded the skeletal remains.

Interpretation

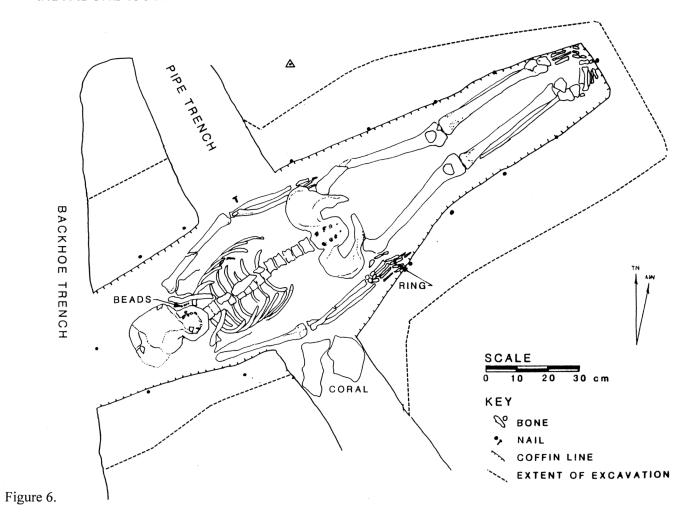
This male died sometime between the ages of 20 and 35 and quite possibly suffered from an infectious disease at the time of his death. Osteological characteristics and the tooth ablation indicate probable Hawaiian ancestry. The knee joint facets tentatively suggest a long term, labor-intensive occupation. The artifact assemblage supposes burial within a decade or two after 1820.

METRIC 1 2 3 4 5

Photo 4. Glass beads near the left side of the neck of I0003.

* * * *

MARIN TOWER BLOCK I E.U. 33&37 PLAN VIEW FEATURE 8 INDIVIDUAL 10003



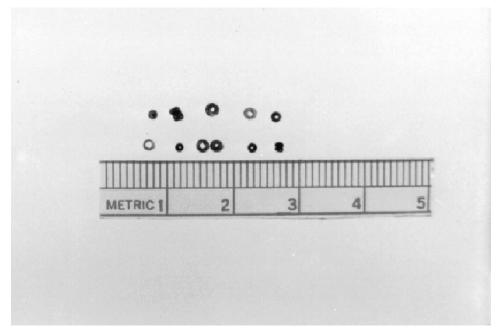


Photo 5. Sample of drawn beads (l-r): 1) red over white; 2) tan over green; 3) tan over light blue; 4) white; 5) tan over green; 6) tan over light blue; 7) black; 8-9) tan over light blue; 10-11) green.



Photo 6. Copper ring with silver wash.

Feature 6

Feature 6 (see Fig. 7) is a grave shaft measuring 179 cm (5'10") northeast-southwest, or *mauka-makai*, and is 52 cm (20.5") wide. The average depth of the fill from the top of the feature to the top of the skeletal remains is nearly 10 cm (3.9"). The electric line pipe trench (ca. 1950) cut through this burial. The sediment matrix is a fine brown silt with no stones in the fill. Buttons, an elaborately constructed and decorated tobacco pipe, and fish bone were with the '*iwi*.

Individual I0004 is an ~15-year-old who was buried in a coffin, which measured 160 cm long (about 5'3"), with head *mauka*. The teeth show signs of physiological stress (nutritional and/or disease) and have an unusually large amount of tartar accumulation. A large notch on the scapula (shoulder area) is consistent with Hawaiian ancestry.

Bone disc buttons were found on or next to the left pelvis; four other buttons were adjacent to the femoral necks (Photo 7). A smoking pipe, made from an iron tube inserted into a shaped wood tube with a copper alloy end that held the pipe stem, was found on the left side of the head⁴ (Photo 8). Fish and mammal bone was found over the thoracic (stomach) region. Cut iron coffin nails, post-1820, surrounded the skeletal remains. Four ceramic sherds (Photo 9) were recovered from the grave shaft fill soils.

Interpretation

This individual may be a female, a supposition based on the orientation of the head. The other three females in Block I have head *mauka* while the males have head *makai*. Children, regardless of sex, may also have been oriented the same as the women. The fish bone (only five vertebrae and four other fragments were present; the species could not be identified) may have been placed either on top of the coffin or on top of individual before interment. It is possible, however, that the fish bone was part of the burial fill that filtered down after the coffin decayed. The ceramics indicate that the burial did not take place before 1825.

Feature 5

Feature 5 is a grave shaft that measures nearly 200 cm (6'6") northeast-southwest, or *mauka-makai*, and averages 54 cm (21") in width (Fig. 8). The depth of the fill from the top of the feature to the top of the skeletal remains is 1-5 cm (about 2"). The ca. 1950 electric line

⁴ Archibald Campbell describes a similar, but more elaborately decorated, pipe that he saw in Hawai'i in 1812, viz. "The tube is made of a hollow stem of a kind of vine, fixed to an iron bowl, which is inserted into hard wood. The stem is covered with rings of ivory and turtle shell, placed alternately; the whole kept firmly together at the top by an ivory mouth-piece" (Campbell 1967: 135).

MARIN TOWER
BLOCK I
E.U. 32&88 PLAN VIEW
FEATURE 6
INDIVIDUAL 10004

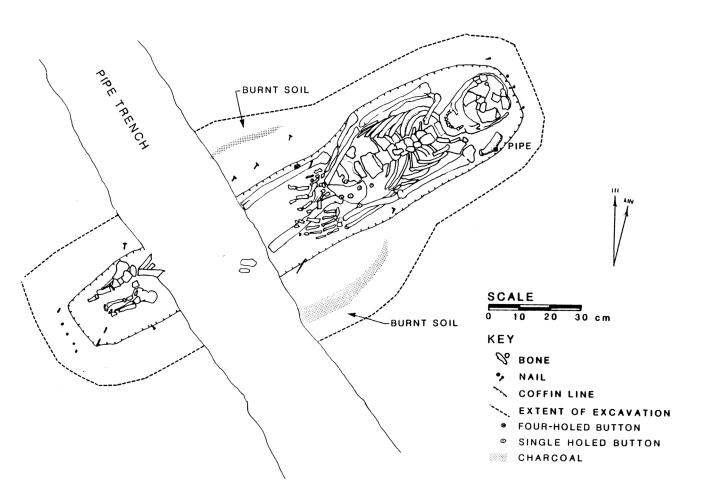


Figure 7.

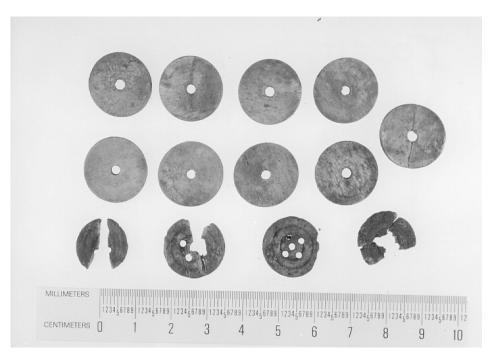


Photo 7. Bone discs (top), bone buttons (bottom).



Photo 8. Smoking pipe.

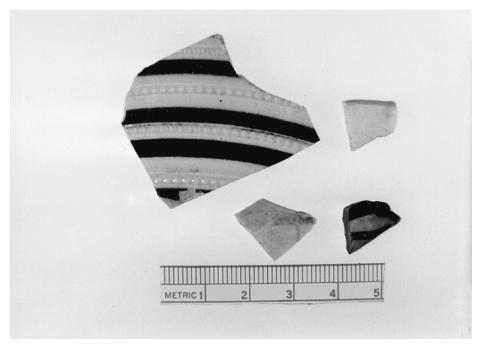
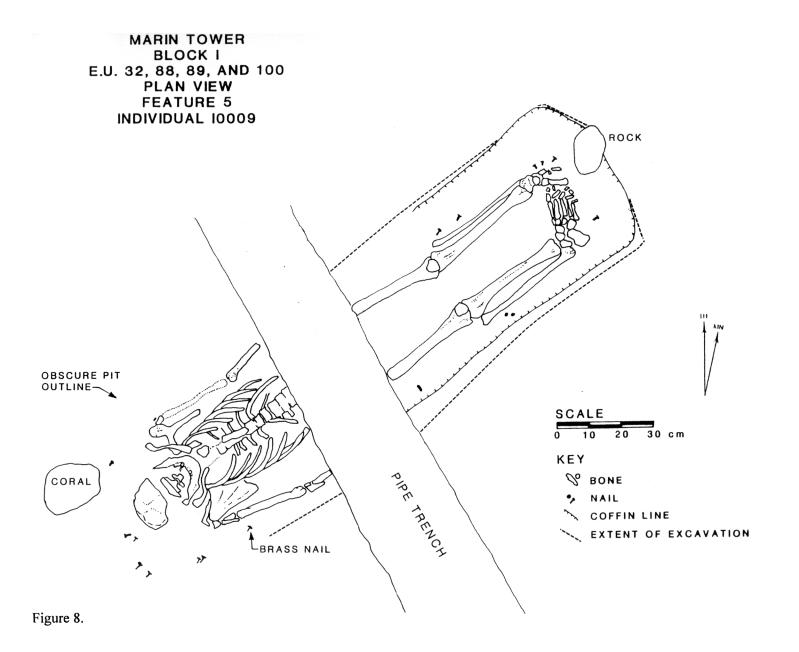


Photo 9. (l-r) banded pearlware sherd, ca. 1795-1815 (Nöel Hume 1978: 131); scalloped rim creamware tea, 1825-1840 (Miller 1991: 16); export porcelain with gilting overglaze, with an "Imari"-like design motif that was produced between 1700-1780 (Nöel Hume 1978: 258); blue painted pearlware sherd, ca. 1779-1820 (Miller 1991: 8).

* * * * *

pipe trench cut across the pelvis region of the burial. The sediment matrix is a gray silt with some light brown silt and clay intrusions and with some shell, cinders, and basalt flakes. A few coffin nails were recovered.

A male, designated I0009, between 40-50 years of age, was laid to rest in a coffin in Feature 5. His head was oriented *makai*. The coffin size, based on nail location, is 180 cm (5'9") long. Several coffin nails, included two of copper alloy, were recovered with this individual; the iron ones seem to be an early type of cut nail made ca. 1815, suggesting this male could have buried as early as that date. No other artifacts were recovered with this individual.



Interpretation

This male was approximately 5'5" tall and is probably Hawaiian. His dental health is generally good, but he had some cavities, enamel hypoplasia (from childhood physiological stress), a peg-shaped tooth, and his lower incisors may have been intentionally removed. His lower leg bones were bent forward in an unusual manner -- perhaps resulting from a genetic condition, a fracture, or an infection.

Feature 7

Feature 7 is a grave shaft that measures 204 cm (about 6'8") northeast-southwest, or *mauka-makai*, and 65 cm (25.6") wide (Fig. 9). The average depth of the fill from the top of the feature to the top of the skeletal remains is nearly 15 cm (nearly 6"). The electric line pipe trench cut through this feature, but seems to have missed the skeletal remains. The sediment matrix is a dark brown sandy silt with some lighter brown fine silt mixed throughout. Some *'ili'ili*, animal bone, coffin nails, and a basalt flake were in the fill; several beads were next to the neck on the right side.

The individual, I0010, in this coffin burial is a female approximately 5'1" tall and between 40-45 years old. Her coffin measures about 180 cm (5'10") in length. She was on her back with her head *mauka*. Her skeleton shows signs of moderate osteoarthritis, not unusual for someone her age. One incisor is markedly shovel-shaped, and there is evidence of periodontal disease and moderate wear of the her teeth. One of her toes and her last lumbar vertebra had been injured earlier in her adult life. Some of her long limb bones exhibit signs of a syphilis-like infection. She is of possible Hawaiian or other Polynesian extraction.

Wound glass beads from a necklace were found by the right side of her head (Photo 10). Many of these beads had a brick red exterior with a white core, a type known as Cornaline d'Aleppo that has been found in a ca. 1855 archaeological context in the (mainland) Pacific Northwest (Sprague 1985: 94)³. A shell was on her right wrist; and several fish bones were on her pelvis. Next to the left side of her head was a concentration of crushed bone of indeterminate nature.

Interpretation

From what is currently known about when the beads were made, it appears this woman was buried somewhere between 1850 and 1860. This makes her one of the last to be

This type of bead may have been manufactured earlier than ca. 1855 in Europe, but may not have reached the Pacific Northwest until several years later (Sprague; Anne Garland, pers. comm., Oct. 19, 1992). It is also probable that this kind of bead was in Hawai'i before reaching California and points north, for it seems that most of the trading ships from Europe and the North Atlantic ports sailed around Cape Horn, up the Chilean coast, then to Hawai'i, and then to California. See Beechert 1991 and Delgado 1990.

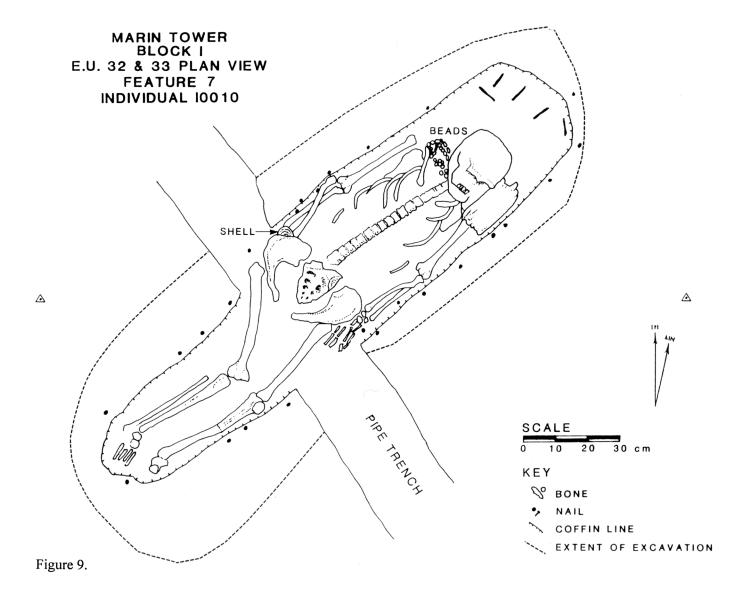




Photo 10. Glass bead necklace.

* * * * *

interred in this location. Continuing research on the beads may turn up some additional information that will cause us to revise this late date.

Feature 10

Feature 10 (see Fig. 10) is a grave shaft measuring 195 cm (about 6'5") northeast-southwest, or *mauka-makai*, and is 50 cm (nearly 20") across at the widest point. The average depth of the fill from the top of the feature to the top of the skeletal remains is 15 cm (nearly 6"). Both Test Trench 6 and the ca. 1950 electric line pipe trench cut through portions of this burial. The fill was a brown sandy silt that contained a large number of *'ili'ili*, shell, animal bone, basalt flakes, and cinders. Numerous coffin nails were found in situ.

Two individuals were disinterred from Feature 10. The primary individual, I0016, is a female between 35-40 years of age. She rested in a coffin on her back with her head *mauka*. She stood approximately 5'3" tall. Her skeletal remains showed no signs of trauma, illness, or abnormality although minimal osteoarthritis - a natural condition of aging - was present. Her teeth had some abnormal wear facets that suggest an overbite. One of her teeth

has an unusual feature virtually identical to one observed in I0002. Her elbows were flexed (the only case among all the burials) in a manner suggestive of cradling a child.

The second individual, I0017, was a fetus or newborn infant (approximately 9 lunar months). This individual was across the pelvic (lower abdomen) region of the female and most likely died in childbirth with its mother.

Artifacts found in the grave shaft fill dirt included a Chinese export porcelain sherd, "swirl" design, possibly post-1850 and a stoneware sherd with brown salt glaze on interior and unglazed exterior for which a date cannot be determined. Several iron coffin nail fragments, very corroded, probably cut nails made post-1820 (Nöel Hume 1978: 253) surrounded the skeletal remains.

Interpretation

This burial seems to have been a mother and newborn (or stillborn) infant. The mother may have died in childbirth. The tooth similarity with I0002 indicates that the two women were related, probably sisters, but also possibly mother and daughter.

Isolated Elements

Block I held a variety of complex archaeological soil strata and features in addition to the burials. Several of these other strata and features contained large amounts of animal and fish bone that archaeologists call faunal materials. In addition, some of the burials contained small quantities of faunal materials. Many of them were small, not-readily-identifiable fragments. As is IARII's standard practice, we forwarded these faunal materials to Dr. Alan Ziegler for identification. During the course of his analysis, he identified a few small bone fragments as human or possibly human (see Appendix C).

We speculate that the human bone fragments identified by Dr. Ziegler that came from non-burial deposits were once part of the Block I burials. They probably were disturbed from their original location during various demolition and construction activities in the decades following their interment.

Rona Ikehara-Quebral, IARII's staff physical anthropologist, subsequently examined the bone fragments identified by Dr. Ziegler. If she concurred that the fragments were human, or probably human, these fragments were immediately removed from the faunal collection and placed with the isolated elements associated with the human burials. She made every effort to relate these elements to one or more of the identifiable individuals or to see whether they were other discrete individuals; neither could be done. No observations, therefore, could be made about the isolated skeletal elements.

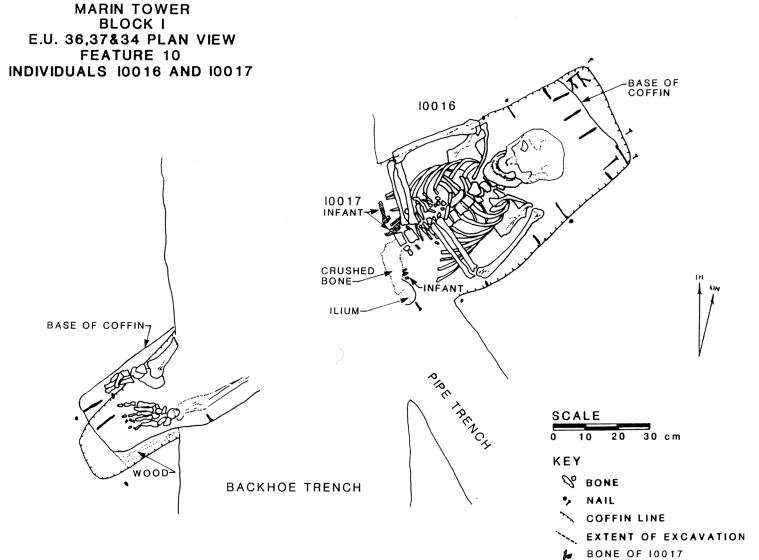


Figure 10.

III: THE BLOCK II BURIALS

No grave shafts were present in Block II. Instead there were areas of great disturbance where concentrations of human skeletal remains, some in situ, some displaced, were uncovered (Fig. 11). A summary is presented in Table 3.

Feature 204/210

This feature is an ephemeral, divided feature that originally was a grave shaft (Fig. 12). It was highly disturbed primarily by demolition and construction activities associated with the ca. 1950 parking garage. The skeletal remains were displaced and divided in the process, which is the reason for the two feature numbers.

Feature 204/210 was defined mostly by the presence of disarticulated human skeletal elements. The feature measures approximately 300 cm (9'10") east-west, or *mauka-makai*, and averages 68 cm (nearly 26.8") in width. The skeletal remains began to appear between 2-10 cm below the asphalt substrate.

The sediment matrix is a very hard, compacted, dark grayish brown silt-sand to sandy silt with a moderate-to-abundant amount of structural debris (brick, concrete, and mortar fragments), asphalt bits, coal bits, with some bottle glass fragments, sherds, and a few iron (coffin?) nails. At the east end of the feature, the sediment merged into a lighter brown sandy silt (more in keeping with grave shaft fill in other burials) than the rest of this feature.

The disturbed and displaced human skeletal elements in Feature 204/210 were determined to be one individual, I0006, 25-35 years of age and probably female. The location of the skeletal elements indicate the individual's head was *mauka*. She was approximately 5'1" tall. Due to the extremely poor preservation and incomplete nature of the skeletal remains, her ethnicity could not be determined. Her skull showed some signs of pitting due to a possible metabolic disturbance, and there is moderate wear and calculus on the single tooth that was present.

Artifacts found in the vicinity of the skeletal elements include: one undecorated, white, 4-hole porcelain button made between ca. 1840-1860; a printed (stippled engraving) whiteware sherd that dates to ca. 1810 (Miller 1991: 9); an iron wire nail, first manufactured ca. 1850; four beads (Photo 11); a fragment from a 20th century monkey wrench; and a 5-sided iron screw-on cap, also a 20th century item.

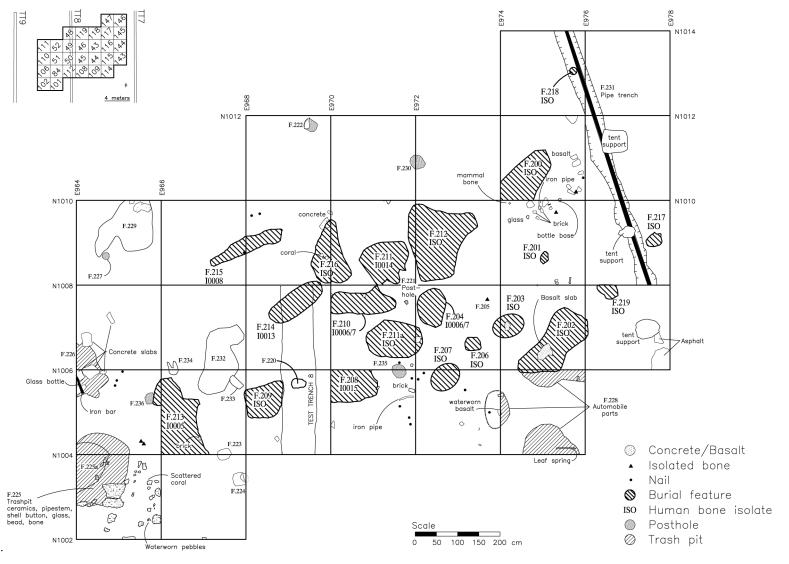


Figure 11.

Table 3. Burials in Block II.

Individual	Sex	Age	Fea. #	Excav. Units	Notes
Isolates			200	117	In the field this small group of disarticulated bones was thought to be a single individual. Lab observations indicate they are simply isolated elements.
I0005	M?	35-45	213	84 & 106	A partial, disarticulated burial; originally a coffin burial, displaced by subsequent demolition & construction activities.
10006/10007	F?	25-35	204 & 210	44 & 45	Designated in the field as two individuals and two features, lab observations concluded that this is one disarticulated individual which we designated I0006.
10008	F	20-25	215	49 & 52	An extended coffin burial.
I0013	М	over 50	214	49 & 50	An extended coffin burial. Isolated elements from Feature 220 (Test Trench 8) were attached to this individual in the lab.
I0014	M	35-45	211	46	A disturbed, disarticulated coffin burial.
Isolates			211a	45	In the field, these elements were thought to be part of I0014. In the lab, however, we determined that they are not part of I0014 or any other identified individual.
I0015, infant	?	6-18 mos.	208	108	A coffin burial.
Isolated elements			212	43	Spatial location suggests these elements could be associated with Feature 200 (10001), with 10006/7, or with 10014.
Isolates			205, 206	44	Two separated groups of isolated elements
Isolates			216	49	Elements north of I0008; unlikely, but possibly associated with I0008
Isolates			207	109	
Isolates	1		209	112	
Isolates			203	44 & 115	A small group of isolates that extends slightly into both units.
Isolates			202	115	
Isolates	1		201	116	
Isolates	1		219	143	
Isolates	1		217	144	
Isolates	1		218	147	

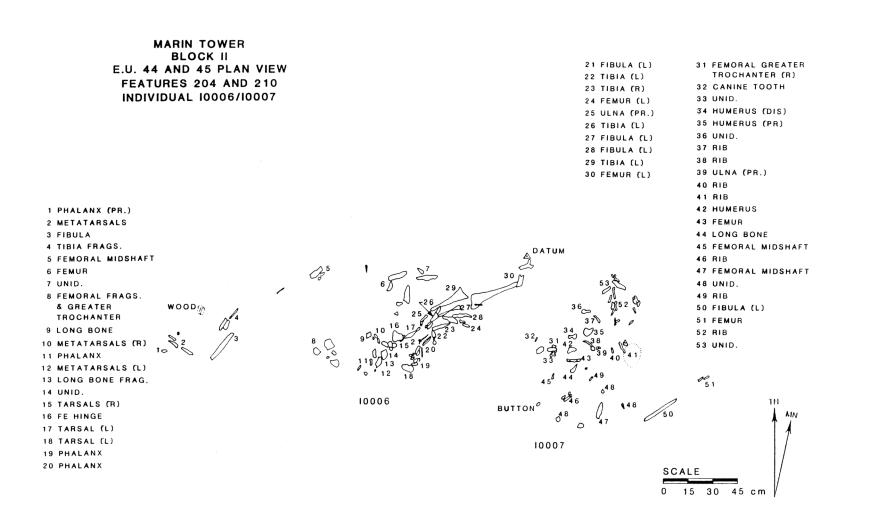


Figure 12.



Photo 11. One tubular bone bead (top) and three red-over-white-core glass beads (bottom). The glass beads look virtually identical to those that compose the necklace depicted in Robert Dampier's 1825 painting of *Karaikapa*, *A Native of the Sandwich Islands* (Forbes 1992: 83).

* * * * * *

Interpretation

Given the highly disturbed nature of the sediment matrix around this individual, the absence of a grave shaft soil stain, the absence of coffin nails surrounding the few skeletal elements, and the highly variable nature of the artifacts that were present, it is not possible to arrive at a verifiable date this woman was buried.

Feature 208

Feature 208 is a coffin burial with a somewhat ephemeral grave shaft boundary (Fig. 13). It measures 77 cm (just over 30") northeast-southwest, or *mauka-makai*, and is about 33 cm (nearly 13") wide. The skeletal remains began to appear between 2-10 cm below the asphalt substrate. The sediment matrix is a dark brown, slightly compacted, sandy silt with some coffin nails, sherds, glass fragments, wood and unidentified metal fragments, bits of plastic, and a spark plug.

The coffin in Feature 208 (Fig. 13) held an infant, I0015, between 6-18 months of age, of indeterminate sex. The infant was placed face up with head *makai*. Due to poor preservation, the remains were removed intact within their soil matrix so the earth could be more carefully removed in the lab. Because of the poor preservation, however, it proved impossible to make further osteological observations. Several iron coffin nails surrounded the '*iwi*. The nails are machine cut and seem to be an early variety manufactured ca. 1815.

Feature 211

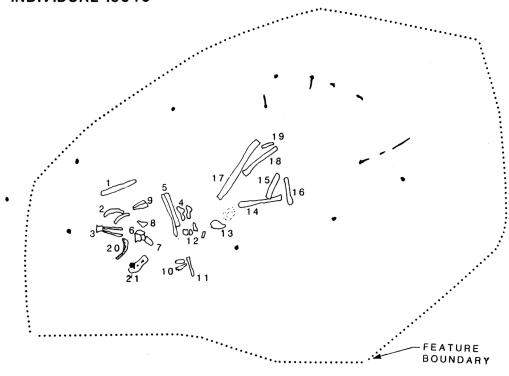
This ephemeral sediment matrix contained several disturbed and displaced human skeletal elements and several artifacts (Fig. 14). In the field it seemed that this feature was oriented north-south and that the southern half cut and divided Features 204/210. Subsequent examination of field notes and drawings in conjunction with observations made by the physical anthropologists indicated the feature was smaller than originally thought and confined to Excavation Unit 46; thus did not cut through Feature 204/210. The description below reflects this new interpretation.

Feature 211 measures 90 cm (35") east-west, or *mauka-makai*, with the same dimensions north-south. The skeletal remains began to appear between 2-10 cm below the asphalt substrate. The sediment matrix is a compact, cemented, brown silt crumb with structural destruction debris, basalt flakes, shell and coral fragments, a few iron nails, glass fragments, and sherds.

Feature 211 contained very incomplete remains of a male, I0014, 35-45 years of age. It appears that the individual's head had been placed *mauka*. The cranial vault bone exhibits possible porosity (a sponge-like pitting) that is suggestive of iron deficiency anemia. No other observations can be made about this male because of the paucity of the remains.

Numerous artifacts were found in the highly disturbed soil matrix around the 'iwi, but none were in direct association or sealed stratigraphic context with the remains; therefore, we cannot say definitively that any of these artifacts belong with this individual. The artifacts include beads (Photo 12), several varieties of ceramics (Photo 13), buttons (Photo 14), some unglazed wall tile fragments (Photo 15), a few ca. 1900 beer bottle fragments, and a few iron cut (ca. 1830) and wire (ca. 1850) nail fragments.





SCALE 0 5 10 15 cm

21 MANDIBLE (UNERUPTED DECIDUOUS TEETH)

1 HUMERUS (LF.) 2 1ST RIB (LF.)

7 RIB 8 RIB 9 RIB 10 RIBS (2)

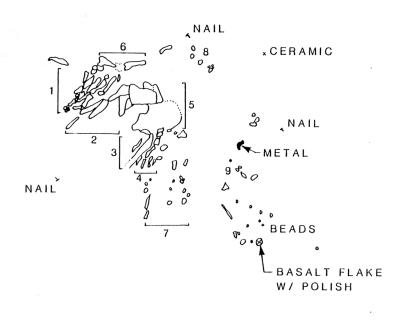
3 T-1 &1ST & 2ND RIB (RT.)
4 LUMBAR VERTEBRAE
5 RADIUS & ULNA
6 THORAXIC VERTS. (2)

11 ARM LONG BONE (RT.)
12 LUMBAR VERTS.
13 PELVIS (RT.)
14 FEMUR (RT.)
15 TIBIA (RT.)
16 FIBULA (RT.)
17 FEMUR (LF.)
18 TIBIA (LF. DISTAL)
19 TIBIA (LF. PROX.)
20 IRON NAIL

• 7 NAIL

Figure 13.

MARIN TOWER BLOCK II E.U. 46 PLAN VIEW FEATURE 211 INDIVIDUAL 10014



- 1 RT. HAND
- 2 FEMUR (R)
- 3 FEMUR (L)
- 4 LF. HAND
- 5 PELVIC GIRDLE
- 6 ULNAR FRAGS. (R)
- 7 ARM FRAGS.
- 8 RIB & MISC. FRAGS.
- 9 RIB FRAGS.

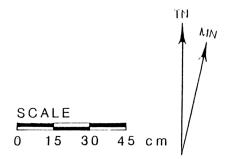


Figure 14.

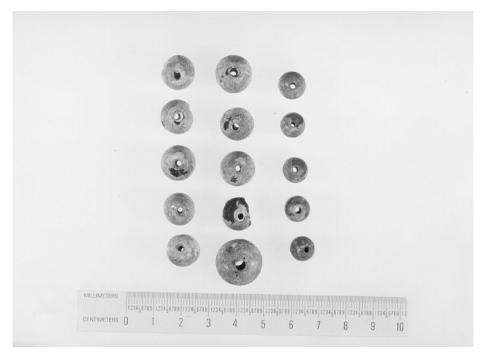


Photo 12. Cornaline d'Aleppo-type red-over-white-core glass beads.

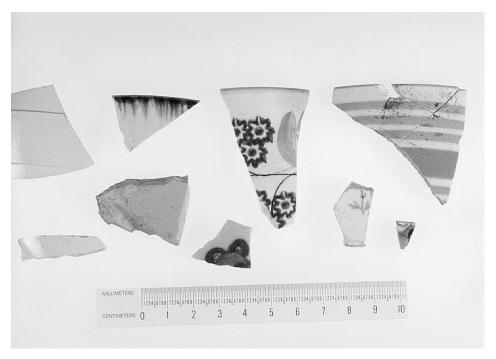


Photo 13. (top, 1-r) Creamware bowl? ca. 1795, blue edged pearlware saucer ca. 1845, sponged pearlware cup ca. 1845, banded pearlware bowl ca. 1800; (bottom, 1-r) plain whiteware ca. 1840, plain yellowware post-1850, Chinese export porcelain, polychrome whiteware, and banded pearlware ca. 1800.



Photo 14. Copper alloy (brass) buttons (top); bone buttons (center); and shell buttons (bottom).



Photo 15. Unglazed decorative wall tile fragments, possibly made in Marin's shop.

Interpretation

Because of the high degree of disturbance from the sequence of construction and demolition on this site, it is not possible using the artifacts to determine with assurance when I0014 was buried.

Feature 213

Feature 213 is a very ephemeral, highly disturbed sediment matrix containing a few skeletal elements (Fig. 15). It measures 120 cm (3'11") east-west, or *mauka-makai*, and 190 cm (6'3") north-south. The skeletal remains began to appear between 2-10 cm below the asphalt substrate. The sediment matrix is a very compacted, dark brown sandy silt with numerous small pebbles, charcoal flecks, shell, and an occasional animal bone. A button, glass fragments, sherds, nail fragments, brick bits, and tiny bits of cloth were also present.

I0005 appears to be a male between 35-45 years of age. His skull vault shows a healed porosis. One femur shows signs of a localized infection, and two of his toe bones were fused. There was only slight evidence of osteoarthritis. It is impossible to determine the original orientation of this individual because of the high degree of disturbance that occurred during construction of the ca. 1950 parking garage.

Several different classes of artifacts were recovered from the same soil matrix as that of the I0005 skeletal remains. These included: ceramic sherds (Photo 16); one small 4-hole china button (ca. 1840-1860); two small bone disc buttons; window glass fragments; post-1920 beer bottle glass fragments; green wine bottle glass fragments, ca. 1870; a fragment of pencil lead; and fragments from a knife (Photo 17).

Interpretation

The skeletal remains of 10005 were severely disturbed and displaced. The presence of the wide range of artifact types from different time periods further reflects the degree of disturbance. Given this, it is not possible to use the artifacts for dating the interment of this particular individual. Instead, the more general ca. 1810-ca. 1850 date range derived from the documentary record is employed.

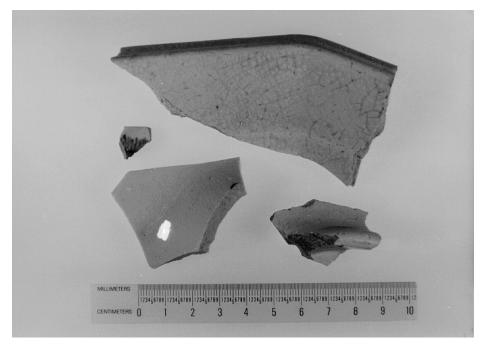


Photo 16. (top, l-r) mocha yellowware, post-1850; plain pearlware service dish, post-1779; (bottom l-r) English stone china?, ca. 1800-1830; and pearlware bowl base, post-1779.



Photo 17. Iron-bladed kitchen knife with wood or bone handle.

MARIN TOWER BLOCK II E.U. 84 AND 106 PLAN VIEW FEATURE 213 INDIVIDUAL 10005

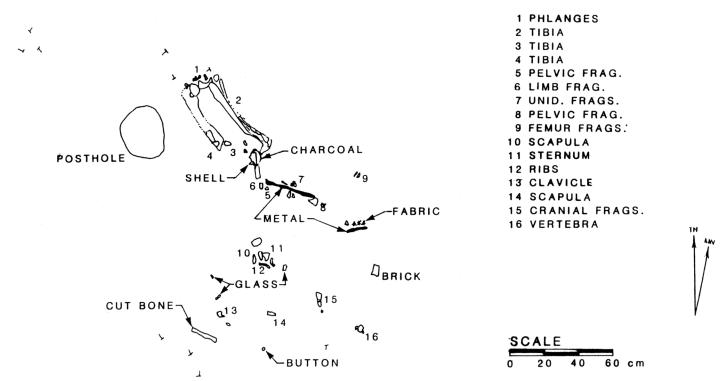


Figure 15.

Feature 214

Feature 214 is a coffin burial that measures 210 cm (6'10") northeast-southwest, or *mauka-makai*, and varies between 40-60 cm (about 20") in width (Fig. 16). The skeletal remains began to appear between 2-10 cm below the asphalt substrate. Test Trench 8 inadvertently cut through part of the skeletal remains. The sediment matrix is a compact, hard brown silt with a few small brick and coral fragments on the surface. Several coffin nails, a fragment of coffin wood, a possible iron hinge fragment, glass fragments, buttons, and a few sherds were also recovered.

Feature 214 is a coffin burial in which individual I0013 was placed on his back with head *mauka*. A robust male, over 50 years of age, he stood approximately 5'10" tall. He suffered from severe osteoarthritis, especially in his knees and spinal column, which may have made it difficult and painful for him to walk. He had a metacarpal injury in his right hand. During his adult life, this man also lost several teeth.

The only artifacts associated with this male were iron coffin nails (made after ca. 1830) and four single-hole bone disks (Photo 18) that most likely were cloth-covered buttons attached to clothing with a hook-and-eye (no fragment of this latter element was found). These were found in the pelvis region and were probably on trousers or an undergarment.

Interpretation

All we know of this man is that he was over 50 and relatively tall and robust, had severe arthritis, had lost several teeth, and that he was buried sometime after 1830.

Feature 215

This feature was a coffin burial with very fragile skeletal remains (Fig. 17). The individual was disinterred in its sediment matrix. The sediments were then only partially removed in the IARII laboratory because of poor preservation of the 'iwi.

Feature 215 is a coffin burial with no discernible grave shaft. It measures 180 cm (5'11") northeast-southwest, or *mauka-makai*, and averages 35 cm (nearly 13.8") in width. The skeletal remains began to appear between 2-10 cm below the asphalt substrate. The sediment matrix is a compacted, dry, hard brown sandy silt with some calcareous sand, volcanic cinder sand, coral fragments, and charcoal flecks. A few coffin nails, brick and slag fragments, and glass fragments were found. A green stain was found in spots around the neck.

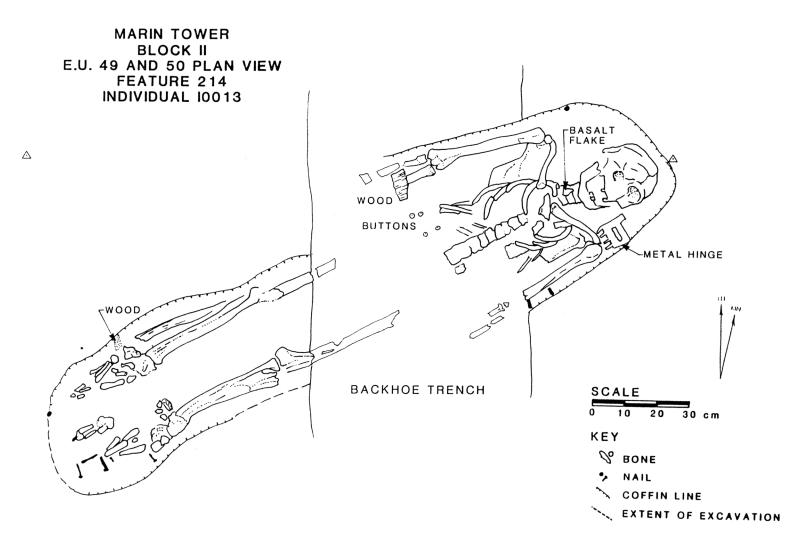


Figure 16.



Photo 18. Bone disk buttons.

* * * * *

This coffin burial contained a female, I0008, 20-25 years of age. She had been placed on her back with head *mauka*. She stood about 5'5" tall. Slight pitting in the skull vault bones suggests a possible metabolic disturbance. Enamel extensions and a single enamel pearl were noted in her teeth. Her ethnicity could not be determined. A copper alloy chain with crucifix (Photo 19) was found in the region of the skull, which probably accounts for the green stains in the sediment matrix around the neck; this was the only artifact found with this individual.

<u>Interpretation</u>

The absence of coffin nails and any other artifact except the crucifix forces reliance on the documentary record for the date of burial for this woman. As with the other cases where artifact sparseness or a high degree of disturbance governs, all we can say at present is that the date of interment falls between ca. 1810 and ca. 1850.

MARIN TOWER BLOCK II E.U. 49 AND 52 PLAN VIEW FEATURE 215 INDIVIDUAL 10008

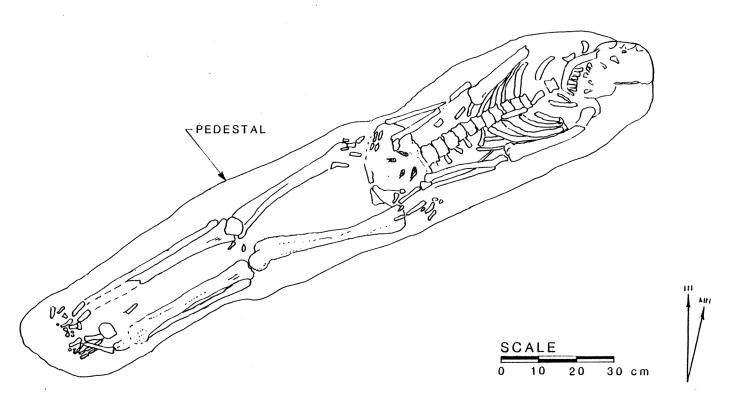


Figure 17.



Photo 19. Copper necklace.

* * * * *

Features 200-203, 205-207, 216-219, and 209

In addition to the six discrete individuals in Block II, several isolated human skeletal elements (individual bones) were found scattered throughout. The physical anthropologists made every effort to relate these elements to one or more of the six identifiable individuals or to see whether they could define one or more other discrete individuals; neither could be done. No observations, therefore, could be made about the isolated skeletal elements.

IV: THE FINDINGS

The intent of this report is to present the data about the Marin Tower Project burials derived from the historical documents, archaeological excavations, and osteological observations. The documents indicated that the only known burials in the project area were associated with the extended Marin family (*ohana*) and that these individuals were interred between ca. 1810 and ca. 1850. Don Francisco reportedly was buried on the property as were some of his children and presumably one or more of his wives. They should have been buried in the family burial plot which we believe was in Block II. Other members of the Marin *ohana* not necessarily genetically linked to Marin would be buried in Block I. If our suppositions are accurate, we expect four sets of data to be discernible.

First, the skeletal remains in Block II would reflect the ethnic physical traits of family members - namely, one southern European, and the rest Hawaiian or mixed Hawaiian-European ancestry. One individual would be Don Francisco, and his skeletal remains would be that of a 60+year-old male with southern European physical traits. His wives were Hawaiian and seem to have been in their mid-to-late teens when he "married" them; their age at death is not known; their 'iwi would have Hawaiian/Polynesian characteristics. Some of his children died within the first year of life while others lived to adulthood and had their own children. Marin's children and their descendants presumably would have mixed Hawaiian and Caucasian physical traits.

Second, the artifact assemblage associated with each burial would include: coffin parts (nails, handles, decorative elements, and in the right environments, fragments of coffin wood); clothing and/or shroud wrappings and fasteners; personal property items buried with the individual (jewelry, religious objects, smoking pipes, etc.); and a wide variety of artifacts from the fill dirt put back in the grave shaft after the coffin was lowered. All of the artifacts from the burials will have to have been made before ca. 1850 if our hypothesis that these are Marin family burials is correct; and few, if any, of the artifacts would be made before 1800. (A basic archaeological principle is that a feature such as a burial cannot be older than the latest artifact found within it; for example, if we found a 1903 penny next to the 'iwi of one individual, we would know that person could not have been buried before 1903.)

Third, if some of the burials are members of the Marin family, then their calculated age at death from observations by the physical anthropologists, ought to be close, or identical, to their age as derived from the written record. If the aforementioned three sets of data match for some of the individuals, our assurance that these individuals are part of the Marin family increases.

Fourth, the burial location in Block I was not identified on any of the historical maps. In addition, these burials were in a line, indicating they may have been buried on one side of

a fence line or other boundary yet they still were on the Marin property. These two factors suggest these individuals, if part of the Marin *ohana*, probably were Hawaiian servants or other employees, and were buried on the property but outside the immediate family vault. If so, their skeletal remains should show Hawaiian physical traits. In addition, the artifact assemblage, while having some of the same kinds of things found in the Marin household, also can be expected to contain some more traditional Hawaiian material culture items.

Interpretations

In looking at the family burial plot (Block II), the documents relate that Don Francisco was 63 or 64 when he died in 1837 and was buried therein. Haiamaui, his first wife, apparently died sometime in 1811 or 1812, but we do not know her age or whether she was placed in the family plot. His second wife, who may have been Haiamaui's sister, seems to have died shortly after 1813, but where she was buried is not known either.

Of the children, Maria Lahilahi was 33 when she died in 1844, and may have been placed in the family burying ground. Lahilahi's son, Francis died in 1850 at the age of 20, and could have been buried there. Two other daughters, Micaela (b. 1796) and Camela (b. 1798), may have been buried in the family ground, but as yet their date of death is not known. At least five of Marin's children lived less than two years: an unnamed son died in 1813; Isabella died in 1814; an unnamed daughter died in 1815; an unnamed son died in 1816; and Francesca died in 1821. Presumably all of them were interred in the family burying ground.

Six individuals were identified in Block II. Three were male and two were female; there was one infant under 18 months of age. One male, I0013, was over 50 when he died; he stood 5'10" tall, had lost several teeth during his adult life; and suffered from severe osteoarthritis in the knee and back. Four bone disc buttons and a few ca. 1830 iron coffin nails were the only artifacts recovered with this individual. Physical indicators of ethnicity for this male are very few in number, and while four of these suggest Hawaiian ancestry, they are quite inconclusive. This is the only male from either Block II or Block I that could be Don Francisco -- the skeletal age fits and the coffin nails were made ca. 1830 or after and could easily have been used for an 1837 burial. The location of the burial in the family vault area matches. There are conflicting documentary reports about whether Marin was tall (as was I0013) or short, and while we know he suffered from kidney problems in his later years (an illness that possibly would leave a trace on the skeleton, but none that is discernible in this case), we do not know (yet) whether he suffered from arthritis and may have been somewhat stooped or walked with a cane. Is this Marin? Possibly. Documentary research and physiological trait comparisons with southern Europeans need to continue in an effort to clarify the question.

Two other males, I0005 and I0014, both 35-45 years of age were also in Block II. Due to the fragmentary skeletal remains, their ethnicity could not be determined. Two of Marin's sons, Frank Paul and Paul Francis, were in their mid-40s when they died,

respectively, in 1867 and 1869, but it is very unlikely that they would have been buried on the property at those times since the Honolulu Ironworks was already occupying some of the area by then. The two males do not fit genetically with any known Marin family member and, therefore, most likely worked in some capacity on the property.

Of the two women buried in Block II, there is a possibility that I0006, who was between 30 and 35 when she died, is Maria Lahilahi, who died in 1844 at age 33. Aside from a couple of 20th-century intrusions, the artifacts associated with I0006 were manufactured between ca. 1840 and ca. 1850 and are therefore consistent with her date of death. The ethnic identity of I0006 cannot be determined due to the incompleteness of the remains.

The second female, 10008, was between 20 and 25 when she died, but there were no associated artifacts to indicate about what year she died. Although she seems to have been wearing a crucifix when buried, she does not match any of the Marin daughters given our present state of knowledge; continuing research may provide further information.

The infant, I0015, could be any one of the five Marin children who did not survive beyond the first two years of life. This is consistent with the ca. 1815 manufacturing date for the small coffin nails.

Nine individuals were buried in Block I. There are three adult females, who were 35 or older when they died; there are two males - one died between 19 and 35 and the other was between 40 and 50; one young person was about 15 at death; one was between 2 and 4 years of age; and two seem to have been fetal remains. All of them appear to be Hawaiian. All of them were buried between 1815 and ca. 1850.

It is possible the two women, I0002 and I0016, are the sisters mentioned by Cox, which means they could be Haiamaui and Caquerua. They both died and were buried in the second decade of the 19th century. Artifacts associated with these two individuals, notably the coffin nails, indicate that burial may have been slightly later, perhaps in the 1830s. Nails from this period, especially when corroded the way these were, are not that reliable as a tool for dating.

The two males, I0003 and I0009, had their lower incisors removed long before they died. Other cases of intentional incisor removal (tooth ablation or evulsion) are known to be associated with mourning rituals among some Hawaiian populations (for example, see Pietrusewsky and Douglas 1993). One male, I0003, exhibited bone changes possibly associated with long-term physical activity, and also had some evidence of treponemal (syphilis) infection. The remaining female, I0010, also showed some indications of possible treponemal infection as well as an injury to her foot and a fracture of her last lumbar vertebra.

Conclusions

When all factors - the written record, the archaeological and artifact information, and the observations about the 'iwi - are considered, it is reasonable to infer that all the burials (Block I and II) are part of the Marin ohana; both the time period and the location fit. It is not possible yet to say with a high degree of certainty that any one individual is Don Francisco, or that others are specific members of his genetic family; but there are some possible matches with some of the Block II burials.

We posited that the Block I burials would be Hawaiian and would be part of the larger Marin household staff. The physical characteristics of the individuals are certainly indicative of Hawaiian ancestry. Biologically, none of them match well with any of the possible Marin individuals likely to be buried on the grounds. Finally, the fact that they seem to have been interred on a separate plot from the family vault indicates a relationship, the nature of which has yet to be determined. It appears likely, therefore, that the original suppositions for the Block I burials are valid.

V: OSTEOLOGICAL LABORATORY METHODS

Human skeletal remains, archaeologically recovered from the Marin Tower Housing Project from March, 1992 to May, 1992, by International Archaeological Research Institute, Inc. (IARII), are described in detail in the following chapters. The remains, associated with coffins and historic artifacts, are from two areas, Block I and Block II, respectively, of the site (Fig. 3). Don Francisco de Paula Marin, of Spanish descent, lived and built his house within the project area beginning ca. 1810 and reportedly was buried at the site upon his death in 1837. Other family members were likely to have been buried here, between 1810 and 1850, after which the property began to be divided.

Following the procedures detailed in the 1992 Memorandum of Agreement (see Appendix A), an osteological analysis of these remains, under the direction of Dr. Michael Pietrusewsky with the principal assistance of Rona Ikehara-Quebral and Michele T. Douglas, was undertaken at IARII from May, 1992 to approximately November, 1992. The major objectives of this study were to determine the exact number of individuals represented, their sex, age-at-death, possible ethnic identity, possible biological relationship with other individuals buried within the project area, and the status of their health. Finally, by matching key vital statistics of each burial (e.g., age, sex, ethnicity, etc.) with historical data, an attempt was made to see if any of the Marin Family can be identified in these remains.

Because the archaeological and historical documentation for the project area indicate that the Block II burials likely represent the family burying ground where Don Francisco Marin and his immediate (and presumably genetic) family members were buried, and Block I may represent the place where other Marin *ohana* were buried, the osteological analysis of these two burial concentrations is kept separate. A preliminary report on the archaeology, historical documentation and physical anthropology pertaining to these burials also was prepared (Goodwin et al. 1992).

Laboratory Procedures

The Marin Tower human skeletal remains, stored in wooden containers in the laboratory at IARII, were unwrapped and cleaned in preparation for osteological analysis. Adhering dirt and debris were carefully removed from the bones using toothbrushes and dental picks. If the remains were delicate and disintegrated easily, no further cleaning was attempted. Otherwise, the remains were washed in cold water and placed in open trays (lined with absorbent paper) to dry. At the end of each washing session, each tray of remains, along with provenience information, was placed in its respective burial container. Once completely dry, reconstruction of postmortem breaks was limited to those bones (mostly skull and long limb bones) essential for obtaining metric and non-metric information. Water-soluble glue

was used to mend such breaks. All loose teeth were placed in their sockets whenever possible and reinforced with glue. Once reconstruction was complete, the remains were placed in permeable cloth bags with provenience information written on the outer bag surface. Small round tags labelled with burial numbers were tied onto long limb bones which did not fit in bags to prevent commingling of unlabelled remains. Three burials, which had been excavated in the field with their surrounding soil matrices intact, were partially excavated in the laboratory. Because of their extremely fragile nature, it was decided to leave these remains largely intact, only a few bones from these intact matrices were excavated in the laboratory and cleaned.

The skeletal elements of each burial were arranged anatomically on a flat surface in the laboratory for inventory and analysis. Intrusive remains could then easily be identified. All nearby burials were checked for possible assignment of intrusive remains. After the initial analysis of the main Marin Tower burials was completed, a box of miscellaneous human skeletal and dental remains from Block II, representing scattered or "isolated" remains, was inventoried (see Appendix E). These isolates were checked against nearby individuals for possible matches.

As stated in the Memorandum of Agreement (1992), the remains were not exposed to direct sunlight and, at the end of each working day, the remains were returned to their storage containers. Photography and radiographs of these remains were not permitted.

Standard data collection forms, approved by the Society of Hawaiian Archaeology, were used to facilitate data recovery. All original data collection forms are kept in binders at IARII.

Age Determination

The age-at-death of subadult skeletal remains was determined using dental eruption and calcification criteria, diaphyseal length measurement and epiphyseal fusion (Bass 1987; Gray 1985; Krogman and İşcan 1986; McKern and Stewart 1957; Stewart 1979; Ubelaker 1987). For fetal remains, measurements of several different bones were used (Fazekas and Kósa 1978).

Several indicators were used to determine the age-at-death of adult skeletal remains. When the bone was present and intact, several different methods of aging the *symphysis pubis* were used (Gilbert and McKern 1973; Brooks and Suchey 1990; McKern and Stewart 1957; Katz and Suchey 1986; Todd 1920, 1921). Other methods used to determine age include the auricular surface (Lovejoy et al. 1985), the sternal end of the rib (İşcan et al. 1984, 1985) and ectocranial suture closure (Meindl and Lovejoy 1985). More general indicators used to age adult remains include dental wear and degenerative joint disease. Some of the criteria employed have been developed using a wide spectrum of racial groups, others are primarily based on modern White populations.

Sex Determination and Parturition

Morphometric features of the pelvis (e.g., subpubic angle, sciatic notch, preauricular sulcus, ventral arc) and skull (e.g., brow ridge development, muscle markings, mastoid size) were used to determine the sex of adult remains. As the skull and pelvis were poorly preserved in most individuals from Marin Tower, the general bone size and robusticity of the infracranial skeleton were heavily relied upon for determining sex. Because of the absence of criteria for determining the sex of subadult skeletal remains, attempts to sex individuals less than 16 years of age were not made. Pitting (parturition pits) on the dorsal surface of the pubis bone (Suchey et al. 1979; Ullrich 1975) and a well developed preauricular sulcus, or Groove of Pregnancy (Houghton 1974) were used as indicators of childbirth.

Measurements

Standard methods of osteometric analysis (Brothwell 1981; Brown 1982; Howells 1973, 1989; Martin 1957; Moore-Jansen and Jantz 1986; Olivier 1969; Wood-Jones 1929) were used to record (to the nearest millimeter) cranial and infracranial measurements. The instruments included Swiss-made sliding and spreading calipers, a small coordinate caliper, a metric tape measure, and an osteometric board. A dial Helios caliper (pointed tips) was used to record (to the nearest tenth of a millimeter) measurements in all permanent teeth. Adopting the standard convention, the left side was selected for recording cranial measurements. If the left side was missing or damaged, the same measurement was recorded on the right side. Subadult cranial and mandibular measurements were recorded when possible. All long limb bones, right and left were measured. Infracranial indices were calculated from both left and right side measurements. Diaphyseal length measurements of the major long limb bones were recorded in subadults and were used with other aging criteria to determine a final age estimate.

Stature Estimates

Estimations of stature were generated using a variety of regression formulae and complete long limb bones. Non-ethnic stature estimates (disregarding sex) were calculated using regression formulae developed by Sjøvold (1990). Polynesian statures were estimated in both sexes using Houghton et al. (1975). Trotter and Gleser formulae for Whites, Mongoloids, and Mexicans in males and Whites in females (Trotter 1970) were also utilized. In order to avoid possible confusion in our reporting, we have retained the racial/ethnic labels used by the authors responsible for these stature formulae. In cases where none of the long bones is complete, an estimated long bone length is generated using segment regression formulae for Whites (Steele 1970). When reporting statures, those estimations using a complete long limb bone were chosen over those generated using a length estimated from a segment measurement. Stature estimates based on lower limb (leg) bones were selected over those based on arm bones. Finally, if a choice was still available, the stature estimate with the least error was the one selected. Various stature estimates were generated based upon non-

ethnic, Polynesian, White, Mongoloid, and Mexican formulae in males and non-ethnic, Polynesian, and White formulae in females.

Non-metric Observations

Many of the non-metric observations recorded in the skull, dentition and infracranial skeletons at Marin Tower follow earlier work by Pietrusewsky (1969, 1976). Other descriptions of non-metric variation in the skeleton and teeth can be found in Anderson (1964), Brothwell (1981), De Villiers (1968), El-Najjar and McWilliams (1978), Hauser and De Stefano (1989), Pardoe (1984) and Saunders (1978). In this analysis non-metric observations are further made in subadult crania, dentitions and infracranial remains.

Ethnicity

Determining the racial affinity from skeletal remains involves assessing metric and non-metric aspects of morphology (the study of form and structure). Both qualitative (e.g., the presence or absence of shovel-shaped incisors, the form of the skull) and quantitative (measurement) observations are required. Differences in proportionality (often expressed as ratios of two or more measurements or indices) have been found to be useful in differentiating major ethnic groups. Some of the more sophisticated methods involve discriminant function analysis using cranial and postcranial dimensions. In this study, determining ethnicity is based on both qualitative and dimensional (measurement) observations (Krogman and Íşcan 1986). Given the lack of adequate craniometric observations in the present project, discriminant function analysis for ethnicity determination was not used in this study.

Paleopathology

All skeletal and dental remains from Marin Tower were observed for pathology⁴. Oral-dental pathology, including premortem tooth loss, enamel hypoplasia, abscessing, periodontal disease, caries, and dental wear, were systematically scored. Degenerative changes in the infracranial skeleton, including the vertebral column, were recorded systematically using a scale of none (0), slight (+), moderate (++), and marked (+++) degrees of osteoarthritic lipping and degeneration which approximates the method of Brothwell (1981:148-50). Other examples of pathological change, which were noted in both adult and subadult remains, include evidence of infection, metabolic disease, congenital variation, and benign tumors (İşcan and Kennedy 1989; Ortner and Putschar 1981; Steinbock 1976; Zimmerman and Kelley 1982).

Some diseases, e.g. osteoarthritis, as well as bone breaks may leave evidence on the skeletal remains. Sometimes historical documents mention that specific individuals sustained a bone fracture or suffered from a particular illness. Pathological observations may help identify an individual.

Data Analysis

Very few cranial, mandibular, and infracranial measurements were recorded in the Marin Tower remains due to the small sample size and poor preservation. Only the dental observations at Marin Tower warranted computer statistical analysis. Dental metric and non-metric data were analyzed by computer using the Statistical Analytic System (SAS) statistical package. Entered data and program outputs were checked against the original recorded data if there appeared to be any discrepancies. All discrepancies were investigated and remedied.

Request For Additional Procedures

Requests for radiographs, photographs, and/or drawings were made in the preliminary report (Goodwin et al. 1992). These procedures were requested for the purpose of documenting non-metric traits or unique conditions which were observed in these remains during our study. This type of documentation is considered to be a basic part of osteological research and serves as visual proof for presenting conclusions, and would have provided a permanent record for the future descendants of the Marin Family.

Radiographs of the paleopathological specimens assist in determining the cause of bony changes in these individuals. Radiographs are non-invasive and do not change the character of the bone in any way. Because of the differences between the manifestations of illness in a living individual and those in a dry bone, radiographs offer a medium for comparison. In this way better documentation and support for a diagnosis can be made.

Some family members expressed a desire for no photographs, radiographs, or other graphic representation of the remains. This was agreed to in the Memorandum of Agreement. We are unable, therefore, to provide this documentation which would have improved the reporting of our findings.

VI: INDIVIDUAL OSTEOLOGICAL BURIAL DESCRIPTIONS

A detailed description of the Marin burials is provided below. These burial descriptions include the provenience, completeness and preservation of the remains, cultural and/or faunal remains associated with each burial, age-at-death, sex, estimated stature, significant features (including paleopathology) of the skeleton and teeth, ethnicity, and other noteworthy features.

Block I Burials

Burial I0002

Provenience: Block I, Feature 9, Excavation Units 34, 35 and 36. This individual was interred in a wooden coffin in an extended position. The lower legs were disturbed by the backhoe during excavation of Test Trench 6.

Completeness: The burial is represented by a substantially complete skeleton. Portions of the upper face, base of the cranium and right mandible are missing. Most of the infracranial bones are present but incomplete. The right patella, some hand and foot bones and a few vertebrae are completely missing.

Preservation: The preservation of these remains ranges from fair to poor. Very few bones are intact and some postmortem weathering is present throughout. The vertebrae have disintegrated almost beyond recognition. The mandible is partially reconstructed. Bone texture is slightly coarse and some leg and foot bones have polished surfaces. Bone color is brown with an orange tinge.

Intrusive Human Remains: A left tibial midshaft (?adult) is intrusive in this burial.

Associated Cultural/Faunal Remains: A wooden coffin fragment with an intact nail, isolated coffin nails, glass fragments, and a basalt flake (?) are associated with these remains. A charcoal sample was collected from the burial fill.

Age: 40 - 50 years (cranial suture closure, the symphysis pubis and dentition).

Sex: Female (cranial and infracranial morphology and general bone size). Several masculine features (absence of frontal bossing, robust zygomatic bone/arch, pronounced *linea aspera*) were observed in this individual.

Stature: The estimated stature for this individual ranges from 5'3" (160.3 ± 3.7 cm) to 5'4.5" (164.2 ± 2.0 cm) using various regression formulae (Houghton et al. 1975; Sjøvold 1990; and Trotter 1970).

Cranial and Mandibular Observations: Very few measurements could be recorded in the cranium due to the incomplete nature of these remains. The mandibular index is 89.2 (medium jaw), the mandibular robusticity index is 34.5 and the ramus index is 72.7 (very high). The mandible exhibits a partial "rocker jaw", a trait observed frequently in Pacific Islanders.

Skull Pathology: There is evidence of healed *cribra orbitalia*, or porosis of the orbital roof, in the right eye socket, suggestive of iron deficiency anemia earlier in life. Exostoses in the left *auditory meatus*, benign tumors of the ear which can be caused by swimming in cold water (Kennedy 1986), and thickening of both tympanic plates, are observed in these remains. A coarse, healed porosis of the outer surfaces of the superior occipital bone and posterior parietal bones is present. A tiny circular defect, 2 mm diameter by 2 mm deep, is noted in a fragment of the occipital bone. This lesion is incompletely filled with trabecular bone and has smooth edges. There is no indication of infection. The defect is likely to be a benign cyst.

Dental Observations: The right upper lateral incisor has a developmental fold on the lingual mesial border (see Comments). The upper lateral incisors are slightly shovel-shaped.

Oral-Dental Pathology: This individual had poor dental health. Five teeth were lost well before death. Pit and interproximal dental caries of the molars and premolars, abscessing at three molar sockets, moderate alveolar resorption, and calculus (tartar) accumulation are noted. Very slight enamel hypoplasias are visible in the canines. The incisors through premolars exhibit considerable wear and an edge-to-edge bite. The mandibular right second molar and left first molar and fourth premolar are discolored a light brown, possibly due to fluorosis or staining from tobacco use. Fluorosis may occur when there is a high level of fluorine in the drinking water (Ortner and Putschar 1981). Because not all teeth in this individual exhibit discoloring, fluorosis is not likely and other interpretations are possible.

Infracranial Observations: Indices recorded in the infracranial skeleton indicate flattening of the right humeral midshaft (66.7) and in both upper femoral shafts (65.6, right and 62.5, left). The upper tibial shaft is medium (69.7) in shape. The tibia thickness index recorded in the right and left tibiae is 76.9 and 66.7, respectively. The disparity of the latter two indices could be due to measuring both tibiae at the estimated midshaft. The *linea aspera*, or pilaster, is strongly developed (128.6, right and 122.7, left). The patella module is 32.0. A septal aperture is present in the left humerus and is absent in the right humerus. The femoral *fovea capitis* is oval-shaped, typical of Pacific peoples.

Infracranial Pathology: There is very little osteoarthritis in the skeleton.

Ethnicity: Mandibular and infracranial indices and non-metric observations, including partial rocker jaw and oval *fovea capitis*, are consistent with Hawaiian ancestry. The estimated stature falls within the range of Hawaiian female statures.

Comments: Miscellaneous foot bones and the distal half of the left tibia were sorted from the general screened matrix of Excavation Unit 36. The disarticulated long limb bones and skull of a 2 - 4 year old child (Burial I0011), were arranged, in an organized manner, at the head of this burial within the coffin outline. Burial I0012, a stillborn or newborn infant, was found in a separate coffin at the foot of Burial I0002. Burials I0011 and I0012 are probably close relatives of this individual, their presumed mother.

The developmental fold observed in one tooth of this individual is similar to one described in Burial I0016. The presence of this fold in the same tooth of both individuals, who were buried side by side, suggests that they are biologically related.

Burial I0003

Provenience: Block I, Feature 8, Excavation Units 33 and 37. This individual was interred in a wooden coffin in an extended position with the head facing west. The pelvis was excavated in a block with the surrounding soil matrix.

Completeness: A substantially complete skeleton is represented. The skull is crushed and very few fragments can be identified. All of the teeth are loose. The hyoid bone is missing. Most of the infracranial bones are present. Only a few hand and foot bones, some vertebrae and a few other bones are missing.

Preservation: The preservation of these remains ranges from good to poor. Some of the long limb bone shafts are solid. The rest of the bones are fragmented or crushed and exhibit considerable weathering. The right ulna was completely restored and some of the other long limb bones were partially reconstructed in the laboratory. Bone color is dark brown.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: 'Ili'ili, glass seed beads, nails, a pearlware sherd, and a metal ring are associated with these remains. A sample of black organic material found only in the soil surrounding the skull was collected in the field.

Age: 19 - 35 years (auricular surface, dentition and slight degenerative changes).

Sex: Male (general bone size).

Stature: The estimated stature for this individual ranges from 5'5" (165.3 ± 3.7 cm) to 5'8.5" (173.4 ± 0.7 cm) using various formulae (Houghton et al. 1975; Sjøvold 1990; and Trotter 1970).

Cranial and Mandibular Observations: Because of the highly fragmentary nature of the skull, no measurements and very few non-metric observations were recorded in these remains.

Skull Pathology: Cannot be determined due to extremely poor preservation of the skull.

Dental Observations: The upper incisors are slightly shovel-shaped.

Oral-Dental Pathology: The dental health of this individual is good. There are no dental caries and tooth wear is minimal. Slight calculus accumulation, suggestive of periodontal disease, is noted in most of this individual's teeth. All four lower incisors appear to have been intentionally knocked out (avulsed). Enamel hypoplasias, indicating physiological stress, occur at approximately one-and-a-half to two years and every half year interval from three to six years of age in this individual.

Infracranial Observations: The humerus at midshaft (71.4) is flattened. The patella modules are 31.3 (right) and 30.3 (left). Squatting facets are noted in the left tibia and both tali.

Infracranial Pathology: Several long limb bones in the infracranial skeleton exhibit cortical swelling of the shaft. The right ulna appears slightly thickened and blunted but there is no active bone infection and no evidence of appositional periosteal bone growth; the right humerus and radius appear normal. Both tibial midshafts exhibit well healed bone apposition. The left tibia has healed periosteal bone formation on the anterior-medial midshaft with slight bulging and the medial midshaft of the right tibia has a more pronounced bulging with no active periostitis. The right fibula distal shaft has a small amount of porosis at the apex of the anterior and lateral borders, with no evidence of reactive bone. The presence of these similar appositional changes in multiple bones suggest systemic disease such as treponemal infection (syphilis or yaws in particular). Additionally, the proximal left tibia has a small ossific nodule at the anterior medial plateau; this is probably the result of an anterior cruciate ligament tear with ossification at the insertion site.

The right femoral distal end has an anomalous "facet" in the intercondylar notch along the medial condyle, extending slightly forward on the medial side. There is also a circular facet of the posterior, superior, medial condyle above the articular facet of the condyles, indicative of extreme flexion of the knee in activities such as squatting. Both facets are mirrored in the left femur. Degenerative changes are minimal throughout the skeleton.

Ethnicity: The presence of deliberate tooth ablation in these remains is consistent with probable Hawaiian ancestry. While the few indices recorded (humeral diaphyseal index and both patella modules) fall below the range of means of the comparative Hawaiian male samples, the estimated stature of this individual falls within the range of Hawaiian male statures.

Comments: None

Burial I0004

Provenience: Block I, Feature 6, Excavation Units 32 and 88. This individual was interred in a wooden coffin, in an extended position. The hands were placed over the pelvis. The cranial vault was collapsed onto the face. The knees and lower legs were truncated by a modern pipe trench. This burial intrudes into Feature 29, a firepit.

Completeness: This burial is represented by a substantially complete skeleton. The skull is crushed but most of it appears to be present. The infracranial skeleton is missing a few hand and foot bones, both patellae and the right lower leg bones.

Preservation: The preservation of these remains ranges from fair to poor. The cranial vault is crushed and the mandible is fragmented. The right humerus, hand and foot bones were the only bones intact at the time of excavation. Other long limb bones required minimal reconstruction. The ends of the long limb bones are weathered. The rib ends are well preserved. The pelvic bones and vertebrae disintegrate easily. Bone color is medium brown with an orange tinge.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: An iron and wood smoking pipe (missing stem) and two types of buttons are associated with these remains. During excavation fish bones were found on the lower abdomen of this individual. The fish bones do not appear to have been ingested.

Age: Approximately 15 years (tooth eruption and calcification, epiphyseal development). Calculus accumulation on the teeth is relatively advanced for an adolescent.

Sex: Cannot be determined.

Stature: Cannot be determined.

Cranial and Mandibular Observations: Due to the extremely fragmentary condition of these remains, very few observations could be made.

Skull Pathology: None noted.

Dental Observations: The right maxillary lateral incisor appears narrow mesio-distally and has anomalous cingulum-like features on the lingual surface. The incisal and lingual edges are very worn. The tooth summary figure [TS(3)] (see Table 10) for this individual's complete dentition, based on the summation of the cross-sectional areas of each tooth, is 1066.1.

Oral-Dental Pathology: Calculus accumulation is noted on all the teeth. No dental caries are observed. Slight to marked enamel hypoplasias, indicating physiological stress, occur at every half year interval from one to six years of age of this individual.

Infracranial Observations: There is a large suprascapular notch similar to that observed in previously described Hawaiian skeletal remains. The left costal bar of the axis vertebra is congenitally absent.

Infracranial Pathology: Osteoarthritis is absent throughout the appendicular and vertebral skeleton.

Ethnicity: This individual is possibly Hawaiian.

Comments: None

Burial I0009

Provenience: Block I, Feature 5, Excavation Units 32, 88, 89 and 100. This individual was interred in a wooden coffin in an extended position. Most of the cranium is missing due to previous disturbance. The lower forearms, hand bones, pelvis and the upper halves of both femora are missing due to excavation of the modern pipe trench.

Completeness: The skeleton is partially complete. The skull is represented by seven isolated upper teeth, the back of the cranium, the hyoid bone and the mandible containing few intact teeth. The infracranial remains are represented by portions of the long limb bones (except the left radius), the patellae and foot bones. Fragments of the sternum, vertebrae and ribs are also present.

Preservation: The preservation of these remains ranges from good to poor. The shafts of the leg long bones are relatively intact and solid. A few foot bones and a single hand phalanx are complete. The tip of the left first toe has been sheared off, presumably by machinery. Several bones, including the fibulae, tibiae, right patella, right calcaneus, and mandible, were successfully reconstructed in the laboratory. Bone color is tan to light brown and bone texture is coarse. Large circular brown spots or stains are evident on the left femoral shaft.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: A few coffin nails are associated with these remains.

Age: 40 - 50 years (rib end appearance, dentition and degenerative changes).

Sex: Male (mandibular and infracranial morphology, bone size and robusticity).

Stature: The estimated stature for this individual ranges from 5'5.5" (166.8 ± 3.7 cm) to 5'8.5" (174.2 ± 0.7 cm) using various formulae (Houghton et al. 1975; Sjøvold 1990; and Trotter 1970).

Cranial and Mandibular Observations: Due to the fragmentary nature of the skull, no cranial and mandibular measurements could be recorded. A few non-metrical observations were recorded in the mandible.

Skull Pathology: Pathology was not observed in the mandible.

Dental Observations: The maxillary lateral incisors are shovel-shaped.

Oral-Dental Pathology: The mandibular incisors were probably deliberately knocked out. A reduced peg-shaped tooth (localized microdontia), possibly the left maxillary canine, was recovered loose and is associated with these remains. There is evidence of periodontal disease in all of the teeth and root caries in two lower molars. Moderate attrition is noted in some of the teeth. Enamel hypoplasias in three canines indicate physiological stress occurred between the ages of four and five-and-a-half years in this individual.

Infracranial Observations: The tibial thickness indices are 68.8 (right) and 71.9 (left). The pilaster is medium-sized on the left (115.4) and strongly developed on the right (120.0). The right patella module is 36.0. Squatting facets are observed in the distal anterior tibiae and both tali.

Approximately 21 shallow, parallel knife(?) cuts, 3 mm each in length, are observed in a fragment of the left femur anterior midshaft. These cut marks, too uniform to be attributed to rodents, may have been made during mortuary preparation although they are not in the typical location, i.e. near the joints (Ubelaker 1989:105). The marks do not appear to have been made by mechanical disturbance during construction activities. The cause of these marks is as yet unknown.

Infracranial Pathology: The left tibia has a large bulge on the medial surface without outward evidence of fracture or active infection. Both tibiae exhibit a dramatic lateral curvature of the anterior spine, with a lateral curvature of the entire bone as well. These curvatures may be developmental anomalies or they may be the result of a fracture. There is slight osteoarthritis in the articular surfaces of the leg bones.

Ethnicity: Estimated stature and infracranial indices are consistent with Hawaiian ancestry. Probable tooth ablation further suggests that this individual is Hawaiian. Shovel-shaped incisors and squatting facets in the tibiae and tali are consistent with Oceanic Mongoloid ancestry.

Comments: None

Burial I0010

Provenience: Block I, Feature 7, Excavation Units 32, 33 and 38. This individual was interred in a wooden coffin in an extended position. During excavation the facial bones and base of the skull were noted to be crushed.

Completeness: An incomplete skull and substantially complete infracranial skeleton are represented. The skull includes bones of the cranial vault, the mastoid processes, left mandible and most of the teeth. The facial bones cannot be identified. Bones missing from the infracranial skeleton include the sternum, a few ribs, most vertebral elements, the pubic bones and a few hand and foot phalanges.

Preservation: The preservation of these remains ranges from fair to poor. Much of the skull was crushed. The right mandible was restored. Most long limb bone shafts are relatively intact. The upper tibial shafts required moderate reconstruction. None of the long limb bones could be fully reconstructed.

Intrusive Human Remains: A pile of unidentified crushed bone was recovered to the left of Burial I0010's head within the coffin outline.

Associated Cultural/Faunal Remains: Two strands of beads (around the neck) and a shell (near the right hand) are associated with these remains. During excavation fish bones were found in the pelvic region of this individual. The fish bones do not appear to have been ingested.

Age: 40 - 45 years (dentition, auricular surface, degenerative changes and cranial suture closure).

Sex: Female (bone size, skull morphology and *linea aspera* development).

Stature: The estimated stature for this individual ranges from 5'0" (152.6 ± 5.0 cm) to 5'1.5" (156.2 ± 2.1 cm) using various formulae (Houghton et al. 1975; Sjøvold 1990; and Trotter 1970).

Cranial and Mandibular Observations: Very few cranial and mandibular measurements were recorded due to the fragmentary condition of these remains.

Skull Pathology: None observed.

Dental Observations: The left maxillary central incisor is markedly shovel-shaped.

Oral-Dental Pathology: The teeth of this individual exhibit evidence of periodontal disease: calculus accumulation is marked in the upper molars and alveolar resorption is marked in the right lower premolars and molars. Attrition to the dentin is noted in most teeth. No dental caries are observed.

Infracranial Observations: Because bone preservation was poor, some of the infracranial indices (those indicated by an asterisk *) were calculated with bone lengths estimated in the field using a tape measure. The humeral robusticity index is 19.8*. The humeral diaphyseal indices (78.9, right and 73.7, left) and right femoral platymeric index (79.3) indicate that the humeral midshafts and upper femoral shaft are flattened. The radio-humeral index, which expresses relative length of the lower arm to the upper arm, is medium (78.4*). The right femur robusticity index is 15.2*. The right pilaster is strongly developed (131.8). The right patella module is 35.7 on the right and 36.0 on the left.

Infracranial Pathology: Several bones of the appendicular skeleton are thickened and appear to have appositional bone growth. The left ulna is thickened and coarse at the midshaft but well healed. The interosseous border is blunted. The other left arm bones and the left clavicle and scapula appear to be normal.

The midshaft of the left tibia is swollen anteriorly and medially. An uneven (lumpy) appearance and coarse longitudinal striations further characterize the medial shaft. The lateral border is similarly affected but to a lesser degree. The left fibula appears blunted and coarsened with healed periostitis on the medial border, especially the distal third. A similar but more pronounced appearance is noted in the left femur, which is considerably heavier than the other long limb bones. The *linea aspera* of this bone is almost lost and appears as a thickened ridge. The entire shaft surface is irregular and bumpy. The proximal end of the left femoral shaft above the third trochanter and the right femoral shaft appear to be unaffected. The femoral head and condyles also appear normal. The left patella has a coarse porosis and spurring on the anterior surface.

Differential diagnoses of the left ulna, tibiae and left femur include treponemal disease and osteomyelitis. The presence of changes in multiple bones are suggestive of systemic disease which makes treponemal disease more likely than osteomyelitis.

The dorsal surface of the right first through fifth metatarsals are swollen and thickened. Coarse porosis is also evident. The articular surfaces are not affected. A proximal phalanx and the left fifth metatarsal are similarly affected. The bones appear to be healed. There may be a drainage cloaca (hole) on the plantar surface of the left fifth metatarsal. Diagnoses include systemic disease or soft tissue infection of the top of the foot extending to the superior surface of the bone.

The right scaphoid and lunate exhibit smooth-walled lesions along the edges of the articular facets; the right metacarpals and left hand bones appear to be unaffected. These lesions are probably degenerative in origin.

Complete *spondylolysis*, or separation of the vertebral arch at the *pars interarticularis*, is noted in the fifth lumbar vertebra. The fracture occurs just below the superior articular facets. A complete arch remnant is present. The fracture surfaces are healed but porotic. The right superior articular facet is disrupted inferiorly. *Spondylolysis* is

considered a stress fracture related to repeated trauma to the lower back. Moderate osteoarthritic changes are noted in the vertebrae, pelvis, knee joint and fifth toes.

Ethnicity: Estimated stature and most of the infracranial indices fall within the range of comparative Hawaiian female values.

Comments: None

Burial I0011

Provenience: Block I, Feature 9, Excavation Units 34, 35 and 36. Secondary bundle burial found in the coffin of Burial I0002 (see Comments).

Completeness: The skeleton is only partially complete. Most of the skull vault bones and the mandible are present. Four deciduous mandibular molars and the permanent tooth buds of the mandibular incisors, right canine, and right first molar were recovered with this individual. The infracranial remains include the diaphyses of the right ulna and femur and fragments of the other lower limb bones.

Preservation: The preservation of these remains ranges from good to fair. The right ulna and femur (reconstructed) are the only intact bones. The remaining lower limb bones are weathered and fragmented. The bones are porous, brittle and light in weight. Bone color is light to dark brown.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: Charcoal, coffin nails, 'ili 'ili, glass fragments, and a basalt flake (?) are associated with these remains. A metal straight pin was also found with the bones and may have been used to keep a burial shroud in place.

Age: 2 - 4 years (dental and tympanic plate development, diaphyseal lengths and fusion of the *pars lateralis*).

Sex: Cannot be determined.

Stature: Cannot be determined.

Cranial and Mandibular Observations: A few of the non-metric observations not considered age-related were recorded.

Skull Pathology: Both tympanic plates exhibit thickening.

Dental Observations: The crowns of the mandibular permanent tooth buds are not completely developed.

Oral-Dental Pathology: The dental health of this child appears to be good. No dental caries are observed. Marked enamel hypoplasias are observed in the mandibular permanent incisors and first molar buds. Only one of these tooth bud crowns was completely developed where linear hypoplastic defects could be measured from the crown/root junction. Hypoplasia measurements of the right lower permanent first molar indicate physiological stress occurred between two and three years of age in this individual.

Fluorosis, an unusual finding in skeletal and dental remains from Hawai'i, is possibly exhibited in the permanent dentition of this individual. The permanent incisor buds are colored medium brown from the approximate mid-crown level to the developing lower edge. The first molar bud is completely brown. The same coloring is not observed in the deciduous mandibular molars but the latter are differentially stained light tan, probably food related.

Infracranial Observations: The maximum diaphyseal lengths of the right ulna (120 mm) and right femur (178 mm) were recorded.

Infracranial Pathology: None noted.

Ethnicity: Because this individual may be related to Burial I0002, its presumed mother, secondary evidence supports probable Hawaiian ancestry for these remains.

Comments: This individual may represent a "bundle" burial. After skeletonization, selected remains consisting of the long bone diaphyses and skull were arranged in an organized manner at the head of Burial I0002, a 40 - 50 year old female, within the latter's coffin. If this is a bundle burial, then it further suggests Hawaiian ancestry (Bowen 1974:146). Burial I0002 is possibly the mother, or a close relative, of this individual.

Burial I0012

Provenience: Block I, Feature 9A, Excavation Unit 36. This individual was interred in a separate wooden coffin at the foot of Burial I0002.

Completeness: A few fragments of the skull and an incomplete infracranial skeleton are represented. Fragments of the right mandible, right facial region and a single tooth bud are all that survive from the skull. The infracranial remains are much better represented than the skull and include bones of the right shoulder, arm and leg bones, pelvis, thorax, the left humerus and femur, and a fragment of the left tibia.

Preservation: The preservation of these remains is fair. All the bones are porous, weathered, and light in weight. Bone color is brown.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: Shell, wooden coffin fragments, coffin nails and small mammal bones are associated with these remains.

Age: 8.5 - 9 lunar months; fetus (tooth bud development and diaphyseal lengths).

Sex: Cannot be determined.

Stature: Cannot be determined.

Cranial and Mandibular Observations/Pathology: The skull was too incomplete to make any observations.

Dental Observations: The single tooth bud recovered is discolored brown.

Oral-Dental Pathology: Only one tooth bud was recovered.

Infracranial Observations: The maximum lengths of complete diaphyses were measured as follows: right clavicle (39 mm), left humerus (55 mm) and both femora (61 mm each). The right scapula height is 32 mm and left ilium width is 28 mm.

Infracranial Pathology: None observed.

Ethnicity: Cannot be determined. Secondary evidence (its possible biological relationship with Burial I0002) suggests this burial may be of Hawaiian ancestry.

Comments: These remains may be a stillborn or newborn infant. The coffin of this individual appears to have been intentionally placed at the foot of Burial I0002, a 40 - 50 year old female. Burial I0002 may have been the mother of this individual.

Burial I0016

Provenience: Block I, Feature 10, Excavation Units 34, 36 and 37. This individual was interred in a wooden coffin which had been mechanically disturbed by the modern pipe trench. The arms are flexed. Most of the pelvis and leg bones have been removed by the backhoe. Due to their delicate nature, the articulated vertebrae were excavated with the surrounding matrix intact. The remains of a fetus or newborn infant were found in the pelvic region of this individual.

Completeness: Due to disturbance the skeleton is only partially represented. Most of the bones of the face, portions of the vault, the hyoid body and the mandible represent the skull. All of the teeth are present and have been returned to their sockets. The infracranial skeleton is missing the left scapula, a few ribs, the lumbar vertebrae, a few hand and foot bones, most of the pelvis, the patellae, and most of the leg long bones.

Preservation: The preservation of these remains ranges from good to poor. Very few bones are complete. Some of the long limb bones were reconstructed. The ends of the long limb bones are damaged. The bones are slightly coarse in texture and disintegrate easily. There is some exfoliation of the cortex. The bone is dark brown in color.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: 'Ili 'ili, a porcelain sherd, a stoneware sherd, wooden coffin fragments and coffin nails are associated with these remains. A large brownish-orange water-worn stone was found embedded in the matrix within the mouth cavity during laboratory examination. The stone may have been placed in the mouth before burial or it may have been near the throat and shifted after burial. No stones were noted in the surrounding burial matrix during excavation of these remains.

Age: 35 - 40 years (rib ends, dentition and degenerative changes).

Sex: Female (skull morphology and gracility of bones).

Stature: The estimated stature for this individual ranges from 5'2" (157.9 \pm 5.0 cm) to 5'3" (159.7 \pm 2.1 cm) using various regression formulae (Houghton et al. 1975; Sjøvold 1990; and Trotter 1970) and the left radius.

Cranial and Mandibular Observations: The maxillo-alveolar index (121.2) indicates the palate is broad.

Skull Pathology: None observed.

Dental Observations: The labial (outer) surfaces of the maxillary incisors and the right mandibular fourth premolar and the occlusal surface of the left maxillary third molar are discolored light brown, possibly food or tobacco stains. This discoloring is not likely to be due to fluorosis because other teeth in this individual which were developing at the same time are not discolored. Differential staining due to seepage of ground or brackish water cannot be ruled out. The right upper lateral incisor has a developmental fold which extends from the lingual distal border down to the root and includes the distal crown. The tooth summary figure [TS(3)] (see Table 10) of the complete dentition of this individual, based on the summation of the cross-sectional area of each tooth, is 1068.8.

Oral-Dental Pathology: The dental health of this individual is relatively good. There is moderate calculus build-up on all teeth and the lower incisors exhibit crowding. Slight alveolar resorption is observed in the mandibular teeth. No dental caries are observed. The dental wear pattern of this individual is noteworthy. Small polished facets are present on the buccal surfaces of the upper left third and fourth premolars and on the first molar crown. A similar facet is noted on the posterior edge at the occlusal surface of the left and right canines. The dentin of the upper incisors have impressions made by the lower incisors. This wear pattern suggests an overbite with the upper jaw extending over the lower jaw. Wear in the

anterior teeth is much greater than wear in the posterior teeth. This extensive wear in the anterior teeth with dentin exposure is suggestive of a coarser diet (such as sucking sugar cane) or use of the anterior teeth as tools (stripping bark for *tapa* making, for example).

Infracranial Observations: Due to poor bone preservation the following indices were calculated using the estimated humerus length taken in the field using a tape measure. The humeral index (73.7) indicates the midshaft is flattened. The radio-humeral index, which expresses the relative length of the lower arm to the upper arm, is medium (71.1, right and 75.3, left).

Infracranial Pathology: There is very little osteoarthritis in the skeleton.

Ethnicity: Infracranial indices, stature and broad palate recorded in this individual are consistent with Hawaiian ancestry. The dental anomaly observed in this individual suggests a biological relationship with Burial I0002 who is also of probable Hawaiian ancestry.

Comments: During excavation, the remains of Burial I0017, a fetus or newborn infant, were found in the disturbed pelvic region of this individual. Burial I0017 may have died *in utero* or may have been placed on the lower abdomen of Burial I0016, its presumed mother, for burial. The mother's arms were flexed across the abdomen suggesting that she may have been buried holding the infant.

The unusual dental fold observed in this individual is similar to that found in Burial I0002. The presence of this fold in the same tooth of two individuals from the same site (who were buried <u>next</u> to each other) suggests that these individuals are biologically related.

Burial I0017

Provenience: Block I, Feature 10, Excavation Units 34, 36 and 37. This individual was found in the pelvic region of Burial I0016, a wooden coffin burial. These remains were disturbed by the backhoe.

Completeness: The skull is missing. Essentially, only the long limb bones from the left side are present. The left medial clavicle, left *os pubis*, distal right humerus and a fragment of the right fibular midshaft regionare also present.

Preservation: The preservation of these remains is fair. All of the bones exhibit post-depositional damage and there is extensive erosion of the cortical bone. The left tibia has been reconstructed. The bones are light to dark brown in color and light in weight.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: 'Ili'ili, a porcelain sherd, a stoneware sherd, wooden coffin fragments and coffin nails are associated with these remains.

Age: 9.5 - 10 lunar months; fetus (diaphyseal lengths).

Sex: Cannot be determined.

Stature: Cannot be determined.

Cranial and Mandibular Observations/Pathology: The skull was not recovered.

Dental Observations/Oral-Dental Pathology: No tooth buds were recovered.

Infracranial Observations: The maximum diaphyseal lengths were recorded as follows: left femur (73 mm), left tibia (61 mm) and left fibula (55 mm). The width of the distal end of the left femoral diaphysis is 16 mm.

Infracranial Pathology: None observed.

Ethnicity: Cannot be determined; however, its presumed mother is of probable Hawaiian ancestry.

Comments: This individual is a either a fetus or a newborn infant; it may have died *in utero* or it may have been placed for burial on the lower abdomen of I0016, its presumed mother.

Block II Burials

Burial I0001

This burial number was originally assigned in the field but later dropped as the fragmentary remains were determined to be isolated human bones from Feature 200, Excavation Unit 117. The remains do not appear to represent a separate individual.

Burial I0005

Provenience: Block II, Feature 213, Excavation Units 84 and 106. A single individual was recovered. During excavation the right lower leg was noted as having been articulated. The torso and shoulder bones were highly disturbed by ca. 1950 demolition and construction activities. No coffin remains were found.

Completeness: A very incomplete skeleton is represented. A small occipital(?) fragment and a fragment of the zygomatic arch are all that represent the skull. The infracranial remains consist of the distal left clavicle, a few arm bone fragments, rib and vertebral fragments, the right patella, fragments of the leg bones (except the right femur) and a few foot bones.

Preservation: The remains are poorly preserved, highly disturbed, and fragmented. With the exception of the patella and a few foot phalanges, none of the bones are complete. Bone color is brown and the texture of these remains is relatively smooth. The left femoral shaft is partially reconstructed. The ninth(?) and tenth(?) thoracic vertebrae are stained green.

Intrusive Human Remains: A child's rib and phalanx are intrusive with these remains.

Associated Cultural/Faunal Remains: Cut (animal) bone, a bone button, shell (including a *Conus* fragment), nails, shoe sole?, animal bones, an animal tooth, fish vertebrae, knife fragments, and pencil lead were found in the disturbed fill but are not directly associated with these remains.

Age: 35 - 45 years (auricular surface and degenerative changes).

Sex: ?Male (patella size and groove of ligament presence).

Stature: Cannot be determined.

Cranial and Mandibular Observations: Due to the extremely fragmentary nature of the skull, metric and non-metric information could be not recorded.

Skull Pathology: A coarse, healed porosis of the outer surface of a cranial vault fragment is observed.

Dental Observations/Oral-Dental Pathology: No teeth were recovered for this individual.

Infracranial Observations: The right patella module is 39.3.

Infracranial Pathology: A small area of infection (periostitis) in the *linea aspera* region of the left upper femur is evident. There is little osteoarthritic changes in these remains. The middle and distal phalanges of the fifth toe are fused bilaterally.

Ethnicity: Cannot be determined.

Comments: None

Burial I0006

Provenience: Block II, Features 204 and 210, Excavation Units 44 and 45. This is a truncated burial. The remains have been greatly disturbed presumably by ca. 1950 bulldozer activity. Soil changes and nail alignment suggest a coffin burial. The left leg was relatively in situ at the time of excavation.

Completeness: The remains, presumably from a single individual, are highly fragmented and incomplete. The skull is represented by a few fragments from the vault, the left

mandibular condyle, and a canine. Representation of the infracranial skeleton is fragmentary. The most complete bone is the left femoral shaft. Much smaller fragments representing the rest of the skeleton are present.

Preservation: The preservation of these remains is extremely poor, only fragments remain. The left femoral shaft has been reconstructed.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: Wooden coffin fragments, coffin? nails, beads, a porcelain button, a metal hinge, a copper fastener, animal bones, and an animal canine were found in the disturbed soil matrix surrounding this individual, but are not necessarily associated with these remains.

Age: 25 - 35 years (osteoarthritis and dental wear).

Sex: ?Female (bone size and *linea aspera*).

Stature: The estimated stature for this individual ranges from 4'9" (149.6 ± 6.3 cm) to 5'1" (154.8 ± 4.2 cm) using various formulae (Houghton et al. 1975; Sjøvold 1990; and Trotter 1970).

Cranial and Mandibular Observations: Due to the extremely fragmentary nature of the cranium and mandible, measurements and non-metric observations could not be recorded.

Skull Pathology: A healed, coarse porosis of the outer surface of a cranial vault (parietal bone?) fragment is observed.

Dental Observations: Only a single tooth belonging to this individual was recovered.

Oral-Dental Pathology: Moderate calculus accumulation and wear exposing the dentin were observed in the single tooth recovered.

Infracranial Observations/Pathology: Metric and non-metric observations of the infracranial skeleton could not be recorded due to the fragmentary nature of these remains.

Ethnicity: Cannot be determined.

Comments: After inspection and study of these remains in the laboratory and reviewing the archaeology notes (proximity in the field and degree of disturbance), Burials I0006 and I0007 were combined and recorded as a single individual. The femur originally from I0006 has a different preservation (solid) and has a more pronounced *linea aspera* suggesting that it may not go with this composite individual. While the ethnicity of this individual is indeterminate, the estimated stature for this individual falls within the range of Hawaiian female statures.

Burial I0008

Provenience: Block II, Feature 215, Excavation Units 49 and 52. This individual was interred in a coffin in an extended position. A coffin outline is not visible but coffin nails were recovered. The remains were excavated with the surrounding matrix intact due to the matrix compactness and the delicate nature of the bones.

Completeness: The majority of the skeleton is represented. The skull is crushed but much of it appears to be present. Most of the metacarpals and hand phalanges are missing. The upper limb bones, the entire thorax, vertebral column, and the pelvis are very incomplete.

Preservation: The preservation of these remains is poor. Some of the calvarium and the upper face appear to have been sheared off by earth moving machinery. A few bones and most teeth (loose) were excavated from the hard clay matrix in the laboratory. The bones are brittle and fragile. The rest of the bones, especially the lower long limb bones below the midfemur (which were already fragmented), were left in the solid soil matrix to prevent further damage. One cranial fragment is stained green, presumably from the crucifix/chain links found with the skull bones of this individual.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: A small copper alloy crucifix and chain links (stained green) are associated with these remains. The crucifix and links were found with the skull bones during laboratory analysis. A soil sample with the green stain was collected in the field. Nails, metal fragments, brick fragments, metal slag, and glass sherds were found in the surrounding soil matrix, but are not directly associated with these remains.

Age: 20 - 25 years (rib end appearance, dentition and epiphyses).

Sex: Female (bone size).

Stature: The estimated stature for this individual ranges from 5'4.5'' (163.8 ± 4.2 cm) to 5'5'' (165.3 ± 0.7 cm) using various regression formulae (Houghton et al. 1975; Sjøvold 1990; and Trotter 1970) and the left tibia.

Cranial and Mandibular Observations: Because most of the skull was crushed, measurements and non-metric variation could not be recorded in the skull of this individual.

Skull Pathology: A healed, coarse porosis is observed in the posterior left parietal bone and in the superior occipital bone.

Dental Observations: Enamel extensions are noted in the maxillary left first and third molar, the right second molar, and the maxillary first molars. An enamel pearl and extension are further noted in the maxillary right third molar.

Oral-Dental Pathology: Calculus accumulation is marked on the maxillary left first molar, moderate on the maxillary left second molar and mandibular left first molar, and slight on the rest of the teeth. Caries are absent. Dental attrition is minimal or absent.

Infracranial Observations: Because the remains were poorly preserved, the following was calculated using the radial and tibial lengths estimated in the field using a tape measure. The left tibial-radial index, which expresses the relative length of the lower arm to the lower leg, is 67.2.

Infracranial Pathology: Osteoarthritis is absent in the lumbar vertebrae and hand bones.

Ethnicity: Cannot be determined.

Comments: Long limb bone measurements taken in the field are the only bone measurements available. While the ethnicity of this individual is indeterminate, the tibial-radial index and estimated stature fall within the range of the comparative Hawaiian female samples.

Burial I0013

Provenience: Block II, Feature 214, Excavation Units 49 and 50. This individual was interred in a wooden coffin in an extended position. This feature was partially bisected by Test Trench 8, which disturbed the pelvis and upper leg region.

Completeness: A substantially complete skeleton is represented. The skull is mostly incomplete, the most complete bones are from the face and mandible. The rest of the skeleton is better represented. The ulnar shafts, some ribs, most of the lower vertebral column, the right *os coxae*, both patellae, the femoral heads and a few hand and foot bones are missing.

Preservation: The preservation of these remains ranges from fair to poor. Except for some long limb bone shafts, much of the skeleton is fragmented. The mandible, right tibia and left upper femur were partially reconstructed to enable collection of metrical data. The bones are solid and their texture is slightly coarse. The bone color is tan to brown with an orange tinge.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: Wooden coffin fragments, coffin nails, and four buttons are associated with this burial. A red-stained soil sample was collected in the field. A metal hinge and mammal bones were found in the coffin fill, but are not necessarily associated with these remains.

Age: \geq 50 years (rib end appearance, dentition and degenerative changes).

Sex: Male (bone size, robustness and *linea aspera* development).

Stature: The estimated stature for this individual ranges from 5'9.5" (176.1 \pm 4.2 cm) to 5'11" (180.7 \pm 4.9 cm) using various regression formulae (Houghton et al. 1975; Sjøvold 1990; and Trotter 1970) and the right humerus.

Cranial and Mandibular Observations: The ramus index (52.5) is medium and the mandibular robusticity index is 43.3.

Skull Pathology: None observed.

Dental Observations: An enamel extension is observed in the left mandibular first molar.

Oral-Dental Pathology: Some of the teeth have been lost well before this individual's death. The lower incisors are missing except for roots. Their loss is very probably due to carious destruction. The intentional removal of these teeth (tooth ablation) seems improbable, especially since other teeth were lost before death. Poor preservation of these remains further complicates interpretation. At least one tooth has an occlusal caries. There is slight to moderate tooth wear in the remaining teeth.

Infracranial Observations: According to index values, the humeral midshaft (70.8) and upper femoral shaft (78.4) are flattened. The pilaster is expanded as a widened ridge (15 - 16 mm) along most of the shaft. The left pilastric index (110.0) is medium. This individual is extremely robust with deep grooves in the articulating surfaces of the sternal end of the clavicle and the clavicular facet of the sternum. A third trochanter ridge formation is noted in the left femur. The right humerus is unusually long (350 mm).

Infracranial Pathology: The right first metacarpal interphalangeal joint is disrupted. The right first metacarpal shaft is expanded with periosteal bone apposition, especially on the volar surface. There is osteophytosis along the medial shaft. The head of the bone is irregular and porotic on the medial side. The proximal facet of the articulating phalanx is disrupted and expanded, with osteophytosis and porosis evident. The shaft of this phalanx appears unaffected. The distal end of the first phalanx has a rounded extended facet on the superior surface with a small amount of eburnation. Differential diagnosis includes open injury to the joint with osteomyelitis of the first metacarpal shaft. Additionally, there is a large smooth-walled opening of the proximal right third metacarpal on the lateral side between the fourth metacarpal facets. Coarse trabeculae are visible on the bottom. This lesion is probably a degenerative change related to osteoarthritis.

Severe osteoarthritis is observed in the knee joints and in the vertebrae. The femoral condyle and tibial plateau are eburnated. The inferior articular facets of the seventh cervical vertebra exhibit extensive osteoporosis and lipping with expansion of the facets. The left facet exhibits eburnation without porosis. The second and third cervical and first and second thoracic vertebrae are also affected but to a lesser degree. The lumbar vertebral fragments exhibit marked osteophytosis and moderate osteoporosis of the end-plates with possible cloaca in the anterior centra.

Ethnicity: The unusually tall stature, the robustness of the long limb bones, and other osteological features suggest a non-European ancestry.

Comments: The left upper third molar, which was sorted in the laboratory from the general screened matrix of Excavation Unit 46, appears to belong to this individual. Historic documents indicate that Block II is the site of Don Francisco de Paula Marin's family burial vault (Gast and Conrad 1973; 1848 Land Commission Award survey map). This individual is the only one recovered from Block II with an age and sex determination consistent with that of Marin. One mandibular index, two infracranial indices, and the estimated stature, however, fall within the range of Hawaiian values. Furthermore, historical records do not indicate that Marin had difficulty walking.

Burial I0014

Provenience: Block II, Feature 211, Excavation Unit 45. This is a disturbed, truncated, primary burial with only the pelvic region and articulated right hand remaining intact at the time of excavation. Based on the orientation of the pelvic region and upper leg, the head is distinctly facing east. The remains were compressed between cement or mortar blocks; no pit outline is visible.

Completeness: This is an extremely incomplete skeleton. Three small vault fragments are all that remain of the skull. The most complete bones are from the right hand. A few fragments from the forearms, right femur, ribs and vertebrae can be identified.

Preservation: The preservation of these remains is very poor. All of the bones exhibit some degree of post-depositional damage and are broken. The bone fragments appear to be solid and are medium in weight. The bone color of these remains ranges from light to dark brown in color. This individual was truncated above the fifth lumbar vertebra and below the femoral midshaft by previous construction activities.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: Historic glass and ceramic fragments, red beads (approximately 1 cm diameter), a polished basalt flake (?), coffin (?) nails, and bird bone were found in the disturbed soil matrix, but are not directly associated with these remains.

Age: 35 - 45 years (rib end appearance).

Sex: Male (*linea aspera* development and bone size).

Stature: Cannot be determined.

Cranial and Mandibular Observations: Due to the extremely fragmentary nature of the skull, detailed observations could not be recorded.

Skull Pathology: A coarse, healed porosis of the outer surface of a cranial vault (parietal bone?) fragment is evident.

Dental Observations/Oral-Dental Pathology: None of the teeth of this individual were recovered.

Infracranial Observations: A femoral fragment exhibits a third trochanter ridge formation.

Infracranial Pathology: Cannot be determined due to the fragmentary nature of these remains.

Ethnicity: Cannot be determined.

Comments: None

Burial I0015

Provenience: Block II, Feature 208, Excavation Unit 108. This disturbed primary burial was interred in a coffin in an extended position. This burial was excavated with the surrounding soil matrix intact due to the delicate nature of the remains.

Completeness: The remains are preserved in matrix; a portion of the right mandible, rib and vertebral fragments, right ilium and the long limb bones are exposed. Three loose mandibular tooth buds are present. The remainder of the individual was not removed from the matrix.

Preservation: The preservation of these remains is very poor. All the exposed bones are fragile and disintegrate easily. The tooth buds are damaged.

Intrusive Human Remains: None

Associated Cultural/Faunal Remains: Coffin nails and wooden coffin fragments are associated with these remains.

Age: 0.5 - 1.5 years (dental development and diaphyseal lengths).

Sex: Cannot be determined.

Stature: Cannot be determined.

Cranial and Mandibular Observations: A portion of the right mandibular body was the only skull bone exposed in the soil matrix.

Skull Pathology: Cannot be determined as the remains were preserved in matrix.

Dental Observations/Oral-Dental Pathology: Due to the postmortem damage of the tooth buds, observations could not be recorded in the teeth.

Infracranial Observations: The maximum diaphyseal length was recorded in the left radius (59 mm), the most complete diaphysis available from this individual.

Infracranial Pathology: Cannot be determined as the remains were preserved in matrix.

Ethnicity: Cannot be determined.

Comments: None

VII: GENERAL OSTEOLOGICAL OBSERVATIONS

This chapter contains a discussion of the findings of the osteological analysis of the Marin Burials. The remains are grouped by Block (I and II) for the discussion.

Completeness/Preservation of Remains

A summary of the completeness and general preservation of these remains is provided in Table 4. Generally, the burials from Block I are more completely represented and better preserved than those from Block II. The Block II burials have been heavily impacted by previous construction activities at the site. Preservation among these latter burials is generally poor. The most complete skeleton removed from Block II is Burial I0013. The subadult remains from the project area are often less complete and more poorly preserved than the adult remains. Roughly half of the Block I burials are substantially complete and an equal number are characterized as having good to fair preservation. None of the skulls from either block are completely intact. Only a few of the long limb bones from the project area are complete enough to allow measurement. The incomplete nature and poor preservation of these remains is a limiting factor in assessing and interpreting the osteological features of these remains. Mending of postmortem breaks and returning loose teeth to their sockets improved the situation only slightly. A few burials that were lifted *en-bloc* were left this way since efforts to extract them from this matrix led to their further disintegration.

Age and Sex Proportions

The age and sex of the burials from the Marin Tower project are summarized in Table 5. A total of nine discrete burials were identified in Block I. Six individual burials were identified in Block II. Two of the Block I burials, I0012 and I0017, represent fetal remains, death occurred at or around the time of birth. Burial I0017 was found in the pelvic region of Burial I0016, suggesting mother and child died during childbirth. Two additional burials from Block I represent a child (approximately 3-4 years old) and an adolescent. Two adult males and three adult females are found among the remains from Block I. The adults range in age from approximately 30 - 50 years of age.

Five (three males and two females) of the six burials in Block II are adults. Younger age-at-deaths are recorded in the females from Block II than among the males from this same block. The oldest (50+ years) individual in the project area, I0013, is found in Block II. One additional burial from Block II is aged between 1-2 years of age.

Table 4. Summary of Preservation and Completeness of the Marin Tower Burials.

		BLOCK	I I		
Burial No.	Sex	Age	Completeness	Preservation	
10002	F	40 - 50 yr.	Substantially complete skeleton	Fair - Poor	
10003	М	Young Adult	Substantially complete skeleton	Good - Poor	
10004	?	approx. 15 yr.	Substantially complete skeleton	Fair - Poor	
10009	M	40 - 50 yr.	Incomplete skeleton	Good - Poor	
10010	F	40 - 45 yr.	Incomplete skull and substantially complete infracranial skeleton	Fair - Poor	
10011	?	2 - 4 yr.	Very incomplete skeleton	Good - Fair	
10012	?	8.5 - 9 lunar mo.	Fragmentary skull and incomplete infracranial skeleton	Fair	
10016	F	35 - 40 yr.	Incomplete skeleton	Good - Poor	
10017	?	9.5 - 10 lunar mo.	Very incomplete infracranial skeleton	Fair	
		BLOCK	II		
Burial No.	Sex	Age	Completeness	Preservation	
10005	M?	35 - 45 yr.	Very incomplete skeleton	Poor	
10006	F?	25 - 35 yr.	Fragmentary skeleton	Poor	
10008	F	20 - 25 yr.	Skeleton in matrix; substantially complete skeleton exposed	Poor	
I0013	М	≥50 yr.	Substantially complete skeleton	Fair - Poor	
10014	М	35 - 45 yr.	Very incomplete skeleton	Poor	
10015	?	0.5 - 1.5 yr.	Skeleton in matrix; mandibular and thorax fragments and long bone diaphyses exposed	Poor	

Table 5. Age and Sex Distribution of the Marin Tower Burials from Blocks I and II (Listed by Burial Number).

	BLOCK I							
AGE	Male	Female	?Sex	Total No.				
Fetal			I0012, I0017	2				
Newborn-0.9				0				
1.0-1.9				0				
2.0-2.9				0				
3.0-3.9			10011	1				
4.0-14.9				0				
15.0-19.9			10004	1				
20.0-24.9				0				
25.0-29.9				0				
30.0-34.9				0				
35.0-39.9		10016		1				
40.0-44.9		10010		1				
45.0-49.9	10009	10002		2				
≥ 50				0				
Young Adult ¹	10003			1				
TOTAL	2	3	4	9				

Table 5 (cont.)

AGE		BLOCKS I & II			
	Male	Female	?Sex	Total No.	
Fetal				0	2
Newborn- 0.9				0	0
1.0-1.9			10015	1	1
2.0-2.9				0	0
3.0-3.9				0	1
4.0-14.9				0	0
15.0-19.9				0	1
20.0-24.9		10008		1	1
25.0-29.9				0	0
30.0-34.9		10006		1	1
35.0-39.9				0	1
40.0-44.9	I0005, I0014			2	3
45.0-49.9				0	2
≥ 50	10013			1	1
Young Adult				0	1
TOTAL	3	2	1	6	15

¹Young Adult=19-35 years

The Skull

Because of the incompleteness of the skulls, very limited cranial measurements and a single index are recorded in these remains (Table 6). Four of the mandibles from Block I and one from Block II are complete enough to allow the recording of at least two of the 26 mandibular measurements (Table 7) normally recorded. None of the mandibles is complete enough to allow all 26 measurements to be recorded. Numerical data recorded in the cranial remains are too few to allow any generalizations to be made regarding cranial size and shape.

* * * * *

Table 6. Cranial Measurements and Indices Recorded in the Marin Tower Burials.

Measurements (in mm)/Indices		BLOCK II		
(I0002 (F) ¹	I0010 (F)	I0016 (F)	I0013 (M)
Minimum frontal breadth		99		
Nasal breadth			27	
Bijugal breadth			113	
Alveolar length			52	
Alveolar breadth			63	
Maxillo-Alveolar index			121.2	
Mastoid height	23			
Mastoid width	17	16		
Bimaxillary breadth			96	
Bifrontal breadth		105	106	
Biorbital breadth		93	92	
Malar length, inferior			44	53
Malar length, maximum			47	
Cheek height	24		21	27
Nasion-bregma chord		113		
Bimaxillary subtense			26	

¹ F=Female, M=Male

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Table 7. Mandibular Measurements and Indices Recorded in the Marin Tower Burials.

Measurements (in mm)/Indices		BLOCK II					
	I0002 (F) ¹	I0010 (F)	I0016 (F)	I0003 (M)	I0009 (M)	I0006 (F)	I0013 (M)
Mandibular length	99				114		102
Inferior length					58		
Alveolar length			57		62		
Bicondylar width	111						
Bicondylar articular breadth	93						
Bicoronoid breadth	95						
Bigonial breadth					106		
Bicanine external breadth	29		31				
Bimolar-1 external breadth			54		62		
Bimolar-3 external breadth			65				
Symphyseal height	31		34				31
Mental foramen symphyseal height	29*						30*
Symphyseal height at C/P3	30*	23*	33				30*
Symphyseal height at M1/M2			30				
Symphyseal breadth	11	11	12		11		

Table 7 (cont.)

Measurements (in mm)/Indices		BLOCK II					
	I0002 (F)	I0010 (F)	I0016 (F)	I0003 (M)	I0009 (M)	I0006 (F)	I0013 (M)
Mental foramen symphyseal breadth	10*	12*	13		14		13*
Symphyseal breadth at C/P3	11*	12*	13		12		11*
Symphyseal breadth at M1/M2			15		16*		
Ramus height	46				60		61*
Ramus breadth	32						32*
Mandibular notch breadth	32						38
Condyle length	11			11	11*	11	10*
Condyle breadth	20*				21*	23	20*
P3-M1 length			25				
M1-M2 length			22				
M1-M3 length			32		20*		
Mandibular index	89.2						
Ramus index	72.7						52.5
Mandibular robusticity index	34.5						43.3

 $^{^{\}ast}$ The right side was measured since the left side was not available. F=Female, M=Male

Non-metric traits recorded in five of the skulls from Block I and one from Block II are presented in Table 8. One individual (I0010) exhibits a mastoid suture bilaterally. Thickening of the tympanic plate is observed in Burial I0002. This same individual has auditory exostoses in the left ear. A partial rocker jaw was observed in one mandible from the project area (I0002). Two other mandibles are classified as non-rockers. Although observations are limited, there are no examples of metopic sutures (0/2), frontal grooves (0/2), palatine tori (0/1), tympanic dehiscence (0/3), mandibular tori (0/6), mylohyoid bridge (0/4), multiple mental (0/5) or mandibular foramina (0/5) in these remains.

The Teeth

Dental Measurements

Dental measurements (mesio-distal and buccal-lingual crown diameters) and cross-sectional areas in the permanent dentitions of six individuals from Block I and three from Block II are presented in Table 9. Two individuals (I0004 and I0016) had all 32 teeth intact. Very similar tooth summary figures (Table 10), an overall measure of tooth size, are reported for Burials I0016 (1068.8) and I0004 (1066.1). The mean tooth summary figures for the individuals from Block I, the largest sample available, is approximately 1079.

Dental Non-Metric Traits

Tables 11 and 12 summarize a number of dental non-metric traits recorded in the permanent teeth of Block I and Block II burials, respectively. The dental features for each of the two blocks will be discussed separately.

Slight shovelling of the maxillary incisors appear to be the norm in Block I individuals. Extensions of the enamel in molar teeth occur in two (Burials I0003 and I0004) of the six burials from Block I, or in 14/46 (30.4 percent) teeth. No examples of enamel extensions in the premolar teeth were observed in the individuals from Block I. A protostylid cusp (0/27) and Carabelli's cusp (0/28), an anomalous cusp that sometimes occurs in the maxillary molars, is not observed in any of the Block I remains. The cusp pattern in maxillary and mandibular teeth is variable in these remains. The "4" pattern is most common (7/8, 87.5 percent) in the maxillary first molars and the "4-" and "4" patterns are equally frequent in the second maxillary molars of the Block I individuals. The "+5" condition is most commonly observed in the mandibular first (2/3, 66.7 percent) and second molars (4/5, 80.0 percent) in Block I individuals. Y-4 and Y-5 patterns are equally observed in the Block I third molars.

Table 8. Cranial Non-Metric Observations Recorded in the Marin Tower Burials.

Trait			BLOCK I			BLOCK II
	I0002 (F) ¹	I0010 (F)	I0016 (F)	I0003 (M)	I0009 (M)	I0013 (M)
Metopic suture	absent	horiz. ridge glab.				
Frontal grooves	*L-	R- L-				
Supraorbital structure	R single notch	R single foramen				
Infraorbital foramen			R single			
Zygo-facial foramen	R & L double		R & L double			R double L three or more
Infraorbital suture			R- L-			
Subnasal	sharp		blurred			
Marginal tubercle	R & L medium		R slight			R- L-
Palatine torus			absent			
Os japonicum			R- L-			
Maxillary torus			R- L-			
Mastoid suture	L-	R+L+				
Mastoid for. exsut.	L temporal bone	L temporal bone				
Coronal wormian		R- L-				
Bregmatic bone		absent				
Occiput form	ridge					

Table 8 (cont.).

Trait			BLOCK I			BLOCK II
	I0002 (F)	I0010 (F)	I0016 (F)	I0003 (M)	I0009 (M)	I0013 (M)
Sagbregma deflect.		absent				
Tympanic thickening	R+L+			R-		
Tympanic dehiscence	R- L-			R-		
Tympanic margin. for.	R- L-		R- L-	R-		
Auditory exostoses	R- L+			R-		
Mandibular torus	R- L-		R- L-		R-L-	
Mylohyoid bridge	L-		L-		R-	R-
Mult. mandibular for.	L-	R-	L-		R-	R-
Mult. mental for.	R-		R- L-		L-	R-
Rocker jaw	partial				non-rocker	non-rocker
Chin form	med.& bil. & ang.		median point		med.& angled inf.	
Ramus shape	R & L cor.>con.					R cor.>con.

1 F=Female, M=Male
* R=right and L=left
R+ L+: present on right, absent on the left
R- L+: absent right, present on left
R- L+: absent on right and left
R- L-: absent on right and left
R+: present on right, left not available
R-: absent on right, left not available
L+: present on left, right not available
absent on left, right not available

Table 9. Mesio-Distal (MD) and Buccal-Lingual (BL) Tooth Measurements (mm) and Cross-Sectional (CX) Areas (mm²) Recorded in the Permanent Dentitions of the Marin Tower Burials.

								BLOCK I		1					
Jaw/Side		I0002 (F	")		I0010 (F)	i		I0016 (F)	1		I0003 (M)		I0009 (N	1)
	MD	BL	CX	MD	BL	CX	MD	BL	CX	MD	BL	CX	MD	BL	CX
Maxillary Right															
M3				8.2	11.6	95.12	7.1	9.2	65.32	8.7	10.8	93.96			
M2				9.2			8.9	10.4	92.56	9.6	11.0	105.60	9.5	11.5	109.25
M1	9.5	11.0	104.50	9.6	11.5	110.40	10.5	11.3	118.65	9.7	11.4	110.58	10.7	11.5	123.05
P4	5.8	9.0	52.20	6.3	9.2	57.96	6.8	8.8	59.84	7.0	9.5	66.50	6.6	10.0	66.00
Р3	6.3	9.4	59.22	6.9	9.6	66.24	6.9	9.4	64.86	7.0	9.5	66.50			
C	7.1	7.5	53.23	7.4	7.9	58.46	7.2	7.5	54.00	7.3	7.5	54.75	7.8	8.0	62.40
I2	6.3	6.4	40.32				6.3	6.3	39.69	5.5	5.6	30.80	6.9	6.0	41.40
I1				7.2	6.0	43.20	7.8	6.7	52.29	6.9	6.0	41.40			
Maxillary Left															
M3							7.2	9.4	67.68	8.6	10.8	92.88			
M2	9.4	11.0	103.40	9.5	11.6	110.20	9.0	10.5	94.50	9.4	10.7	100.58			
M1	9.6	11.0	105.60	8.8	10.7	94.16	10.4	11.3	117.52	9.2	11.5	105.80			
P4	6.2	9.0	55.80				6.8	8.8	59.84	6.7	9.3	62.31	6.8	9.5	64.60
Р3	6.7	9.6	64.32				6.8	9.3	63.24	6.7	9.3	62.31			
C	7.0	7.7	53.90	5.0	7.8	39.00	7.2	7.5	54.00	7.1	7.7	54.67			
I2	5.9	6.5	38.35				6.6	6.2	40.92	5.5	5.7	31.35	6.6	6.0	39.60
I1	8.2	6.7	54.94	7.3	6.7	48.91	8.0	6.8	54.40	7.0	6.0	42.00			

Table 9 (cont.).

								BLO	CK I						
Jaw/Side		I0002 (F))		I0010 (F)		I0016 (F	")		I0003 (M	f)		I0009 (M	I)
	MD	BL	CX	MD	BL	CX	MD	BL	CX	MD	BL	CX	MD	BL	CX
Mandibular/ Right															
M3							9.8	9.2	90.16	10.4	8.9	92.56	10.0	10.2	102.00
M2	10.6	9.5	100.70				10.3	9.0	92.70	10.8	9.4	101.52	11.0	10.5	115.50
M1							11.8	10.3	121.54	10.6	9.6	101.76	11.0	10.7	117.70
P4	6.0	8.2	49.20	6.2	7.8	48.36	6.8	7.6	51.68	6.7	7.5	50.25	6.9	8.8	60.72
P3	5.9	8.2	48.38	6.5	8.3	53.95	6.7	7.7	51.59	7.0	8.3	58.10	7.0	7.6	53.20
C	6.2	6.9	42.78	6.3	7.4	46.62	6.1	7.6	46.36	6.0	6.6	39.10	6.8	7.1	48.28
I2	5.4	6.1	32.94	5.3	5.7	30.21	5.6	6.1	34.16						
I1	5.0	5.8	29.00	4.9	5.5	26.95	4.9	5.5	26.95						
Mandibular/ Left															
M3	9.5	8.8	83.60				10.6	9.1	96.46	10.3	9.2	94.76			
M2				10.9	10.5	114.45	10.4	9.3	96.72	10.7	9.6	102.72	11.0	10.2	112.20
M1				11.4	10.5	119.70	11.8	10.3	121.54	10.6	9.5	100.70	11.0	11.3	124.30
P4				6.8	8.0	54.40	6.9	7.5	51.75	6.8	7.8	53.04	6.9	9.4	64.86
P3	6.2	7.5	46.50	6.4	8.5	54.40	6.8	7.5	51.00	6.9	8.1	55.89	6.7	8.2	54.94
C	6.4	7.1	45.44	6.3	7.4	46.62	6.2	7.3	45.26	6.1	6.7	40.87	7.1	7.1	50.41
I2	5.2	6.0	31.20	5.6	5.9	33.04	5.5	6.0	33.00						
I1				4.9	5.2	25.48	4.9	5.6	27.44						

Table 9 (cont.).

		BLOCK	I						BLOC	K II					
Jaw/Side		I0004 (?se	ex)		I0006 (F)			I0008 (F))]	(0005 (M)			I0013 (N	1)
	MD	BL	CX	MD	BL	CX	MD	BL	CX	MD	BL	CX	MD	BL	CX
Maxillary Right															
M3	7.6	9.0	68.40				7.9	9.8	77.42						
M2	8.6	11.6	99.76				8.9	11.0	97.90				9.7	11.8	114.76
M1	10.1	11.0	111.10				9.0	11.0	99.00				10.3	12.5	128.75
P4	6.5	9.1	59.15				5.7	7.8	44.46						
P3	6.5	8.7	56.55												
C	7.0	7.9	55.30	6.1	7.5	45.75							8.3	8.2	68.06
I2	4.9	4.1	20.09												
I1	7.8	6.4	49.92												
Maxillary/ Left															
M3	7.9	10.4	86.16				7.2	9.3	66.96				8.4	11.0	92.40
M2	8.7	11.7	101.79				9.3	11.0	102.30						
M1	10.3	11.0	113.30				9.3	10.9	101.37						
P4	6.1	8.8	53.68				6.4	9.0	57.60				6.4	9.2	58.88
P3	6.4	8.9	56.96				7.2	9.9	71.28				6.7	9.7	64.99
C	7.3	8.0	58.40										8.3	8.0	66.40
I2	5.2	5.3	27.56												
I1	8.0	6.4	51.20												

Table 9 (cont.).

		BLOCK	I						BI	OCK II					
Jaw/Side	I	0004 (?se	ex)		I0006 (F)			I0008 (F)		I0005 (M)		I0013 (M)	
	MD	BL	CX	MD	BL	CX	MD	BL	CX	MD	BL	CX	MD	BL	CX
Mandibular/ Right															
M3	10.5	9.7	101.85												
M2	10.4	9.9	102.96				10.5	10.1	106.05						
M1	11.7	10.4	121.68				10.1	9.9	99.99						
P4	6.5	8.0	52.00										7.2	8.4	60.48
P3	6.4	7.4	47.36				6.4	8.0	51.20				6.7	7.9	52.93
C	6.4	8.0	51.20				5.9	7.5	44.25				7.5	7.7	57.75
I2	6.1	5.9	35.99				5.3	6.3	33.39						
I1	5.2	5.1	26.52												
Mandibular/ Left															
M3	10.3	10.0	103.00												
M2	10.1	9.4	94.94				10.2	10.4	106.08	9.9	9.5	94.05			
M1	11.5	10.0	115.00				10.5	10.4	109.20				11.6	10.5	121.80
P4	6.2	8.4	52.08				6.9	8.0	55.20						
P3	6.3	7.5	47.25				6.5	7.8	50.70						
C	6.4	8.1	51.84				5.9	7.5	44.25				7.4	7.9	58.46
I2	6.2	6.0	37.20												
I1	5.0	5.2	26.00												

Table 10. Tooth Summary (TS) Figures for Permanent Dentitions of the Block I¹ Burials From Marin Tower.

Tooth Summary (TS) ²	Male (N)	Female (N)	?Sex (N)	Total (N)
TS(1)	(0-2)	1062.8 (1-3)	1066.1 (**1)	1079.6 (3-6)
TS(2)	(0-4)	1066.6 (3-6)	1065.9 (2)	1079.1 (7-12)
TS(3)	(0)	1068.8 (*1)	1066.1 (**1)	1067.4 (2)

¹There are no tooth summaries for individuals from Block II.

TS(2) =Tooth summary figure is based on summation of cross-sectional areas calculated from mean of each diameter measurement (mean MD x mean BL) for each tooth, right and left sides combined.

N = Range from least to maximum number of individual teeth.

TS(3) =Tooth summary figure is based on means of TS figures for complete individual dentitions.

N = Number of individuals with complete dentitions.

²TS(1) =Tooth summary figure is based on summation of mean cross-sectional areas calculated from individual pairs of measurements (MD x BL) for each individual.

N = Range from least to maximum number of individual teeth.

^{*}Individual I0016

^{**}Individual I0004

-I04

Table 11. Dental Non-Metric Variation Recorded in the Permanent Teeth of the Block I Burials from Marin Tower (Sides and Jaws Combined).

						BLC	OCK I							СК I ГАL
Variation	I0002 (F 40-50) ¹	10010	(F 40-45)	I0016 (F 35-40)	I0003 (N	Л 19-35)	10009	(M 40-50)	10004	(?sex≈15)		-
	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%
Shovel-shaped incisors														
Maxillary														
slight	2/2	100.0	0/1	0.0			4/4	100.0	2/2	100.0	2/3	66.7	10/12	83.3
moderate	0/2	0.0	0/1	0.0			0/4	0.0	0/2	0.0	1/3	33.3	1/12	8.3
marked	0/2	0.0	1/1	100.0			0/4	0.0	0/2	0.0	0/3	0.0	1/12	8.3
Mandibular														
slight	0/3	0.0	0/4	0.0	0/4	0.0					2/4	50.0	2/15	13.3
Molar enamel exten.	0/3	0.0	0/5	0.0	0/12	0.0	10/12	83.3	0/7	0.0	4/7	57.1	14/46	30.4
Premolar enamel exten.	0/5	0.0	0/8	0.0	0/8	0.0	0/8	0.0	0/5	0.0	0/4	0.0	0/38	0.0
Protostylid cusps	0/2	0.0	0/2	0.0	0/6	0.0	0/6	0.0	0/5	0.0	0/6	0.0	0/27	0.0
Carabelli's cusps	0/3	0.0	0/5	0.0	0/6	0.0	0/6	0.0	0/2	0.0	0/6	0.0	0/28	0.0
Max. cusp patterns														
M1														
4-			0/1	0.0	0/2	0.0	1/2	50.0	0/1	0.0	0/2	0.0	1/8	12.
4			1/1	100.0	2/2	100.0	1/2	50.0	1/1	100.0	2/2	100.0	7/8	87.
M2														
4-			0/1	0.0	2/2	100.0	0/2	0.0	0/1	0.0	2/2	100.0	4/8	50.
4			1/1	100.0	0/2	0.0	2/2	100.0	1/1	100.0	0/2	0.0	4/8	50.

Table 11 (cont.).

						BL	OCK I						BLO TOT	
Variation	10002 (F 40-50)	I0010 (F 40-45)	I0016 (F 35-40)	I0003 (M	1 19-35)	I0009 (M 40-50)	10004	(?sex 2-4)		
	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%
M3														
3-			0/1	0.0	2/2	100.0	0/2	0.0			0/2	0.0	2/7	28.6
3			0/1	0.0	0/2	0.0	0/2	0.0			2/2	100.0	2/7	28.6
4-			1/1	100.0	0/2	0.0	2/2	100.0			0/2	0.0	3/7	42.9
Mand. cusp patterns														
M1														
+5							2/2	100.0	0/1	0.0			2/3	66.7
Y5							0/2	0.0	1/1	100.0			1/3	33.3
M2														
+5			0/1	0.0			2/2	100.0	2/2	100.0			4/5	80.0
Y5			1/1	100.0			0/2	0.0	0/2	0.0			1/5	20.0
M3														
Y4	1/1	100.0					0/2	0.0	0/1	0.0			1/4	25.0
Y4 & wrinkled	0/1	0.0					1/2	50.0	0/1	0.0			1/4	25.0
Y5	0/1	0.0					0/2	0.0	1/1	100.0			1/4	25.0
Y5 & wrinkled	0/1	0.0					1/2	50.0	0/1	0.0			1/4	25.0

¹ F=Female, M=Male

Table 12. Dental Non-Metric Variation Recorded in the Permanent Teeth of the Block II Burials from Marin Tower (Sides and Jaws Combined).

			BLOC	K II				OCK II DTAL
Variation	I0008 (I	F 20-25)	I0005 (M	[35-45)	I0013 (I	M ≥50)		
	n/N	%	n/N	%	n/N	%	n/N	%
Shovel-shaped mand. incisors - slight	1/1	100.0					1/1	100.0
Molar enamel exten.	6/10	60.0	1/1	100.0	1/4	25.0	8/15	53.3
Molar enamel pearl	1/10	10.0	0/1	0.0	0/4	0.0	1/15	6.7
Premolar enamel exten.	0/6	0.0			0/4	0.0	0/10	0.0
Protostylid cusps	0/4	25.0	0/1	0.0	0/1	0.0	0/6	0.0
Carabelli's cusps	0/6	0.0			0/3	0.0	0/9	0.0
Max. cusp patterns M1								
3+	0/2	0.0			1/1	0 100.	1/3	33.3
4	2/2	100.0			0/1	0.0	2/3	66.7
M2								
4-	2/2	100.0			0/1	0.0	2/3	66.7
4	0/2	0.0			1/1	0 100.	1/3	33.3
M3								
3	2/2	100.0			0/1	0.0	2/3	66.7
4	0/2	0.0			1/1	0 100.	1/3	33.3
Mand. cusp patterns								
M1								
+4	1/2	50.0			0/1	0.0	1/3	33.3
Y4	1/2	50.0			1/1	0 100.	2/3	66.7
M2	0.72		1/1	100			1/2	22.2
+4	0/2	0.0	1/1	.0			1/3	33.3
Y5	2/2	100.0	0/1	0.0			2/3	66.7

Observations of incisor shovelling in the Block II individuals are not possible. Molar enamel extensions are relatively common (53.3 percent) in Block II individuals and an enamel pearl is observed in one molar tooth from this block (Burial I0008). As is the case for Block I, there are no incidences of protostylid, Carabelli's cusps, or premolar enamel extensions in any of the individuals from Block II. There are too few maxillary molars to summarize the predominant cusp pattern in the Block II remains. The "Y4" pattern is frequent (66.7 percent) in the first molars and the "Y5" pattern is equally frequent in the second mandibular molars.

Oral-Dental Pathology

Oral-dental pathology, including premortem tooth loss, caries, abscessing, periodontal disease, attrition, enamel hypoplasia and tooth ablation are summarized by individual for Block I and II burials in Tables 13 and 14, respectively.

Peg-shaped teeth, or localized microdontia, is extremely rare in these remains, a single example is recorded in Burial I0009, a 40-50 year old male from Block I.

Premortem tooth loss, attributable to a number of disease processes including caries, periodontal disease and trauma, is recorded in three of the six adults from Block I. The number of teeth lost in these individuals ranges from one to six, the latter number occurs in a single individual (Burial I0002).

Caries, or decay of the dental enamel caused by the lytic action of bacteria, is observed in one of the six burials from Block I. This individual (I0002), a 40-50 year old female, has four interproximal and two occlusal caries in 22 teeth available for study.

Dental abscessing in the molar and premolar regions is observed in three individuals (10002, 10009, and 10010) from Block I. Fifteen percent (6/40) of the premolar and molar pockets are affected in Block I individuals.

Indicators of periodontal disease (calculus, rolled rim, and alveolar resorption), an inflammatory response to one or more irritants (Ortner and Putschar 1981:442), are observed in four of the six individuals from Block I. Alveolar resorption was generally slight to moderate in expression. Calculus deposits are observed, to some extent, in all six Block I individuals. The level of calculus accumulation in this sample rarely exceeds the slight level. However, Burials I0002 and I0010, both of advanced age, exhibit moderate and marked levels of calculus.

Dental attrition, or the loss of the enamel surface of the tooth through functional (dietary) or secondary uses of the teeth, was observed in all of the permanent teeth in Block I individuals. Exposure of the dentin (moderate wear) and pulp (extensive wear) were observed in Burial I0010. Tooth wear in the remaining individuals reached the enamel (slight) or dentin levels.

Dental enamel hypoplasia is an abnormality in the calcification of the developing tooth, which is permanently recorded in the tooth structure as a longitudinal groove, pit, or series of pits. The defect is caused by a physiological stress, which animal research has shown could be heat, cold, infection, fever, or malnutrition (Huss-Ashmore et al. 1982). The defects record past episodes of physiological stress which the individual survives. Hypoplastic defects in the deciduous dentition reflect physiological stress during fetal and early infant development, while defects in the permanent dentition reflect early childhood stresses. Because the growth and development of teeth are fairly well documented, although there are differences between ethnic groups, measurement of the distance of the defect from the edge of the completed crown can help to determine the age-at-occurrence of the stressing episode (Murray and Murray 1986). The presence of multiple defects on a single tooth suggest repeated episodes of stress, while defects on multiple teeth suggest a more severe stress episode.

Enamel hypoplastic defects are observed in three of the five adults, one adolescent, and one child from Block I. These examples of hypoplastic defects are generally of slight occurrence, although two defects of moderate size were noted in Burial I0009, a 40-50 year old male. Burial I0004 (an adolescent) has hypoplastic defects in 12 teeth which range in severity from slight to moderate.

Four individuals from Block I have dental enamel hypoplasias which could be measured. In all of the cases the defects predominately occur between the ages of 2 - 4 years. This age period is known as the "weaning" age, when a child is weaned from breast milk and begins to eat an adult diet. This transition may result in a relative decline in nutritional status, resulting in abnormalities of tooth development, as well as an increase in disease stress as the immune system develops.

Very limited observations of dental pathology could be made in the Block II remains because of the poor preservation. Three teeth of Burial I0013 (an elderly male from Block II) were lost premortem. A single carious tooth was observed in Block II, also in Burial I0013. No abscessing is observed in the very limited dental remains from Block II. Burial I0013, from Block II, exhibits extensive periodontal disease although these observations are greatly limited. Seventy-five percent of the teeth from Block II exhibit some wear, the majority (62.5 percent) affect only the enamel, the rest have dentin exposure. Burial I0013, the oldest individual, has the most extensive wear. Two slight hypoplastic defects are observed in Burial I0013 from Block II.

There were no cases of third molar agenesis in the dental remains from the Marin Tower site. Possible tooth ablation, or deliberate extraction, of the anterior teeth is observed in two individuals (I0003 and I0009) from Block I. All four lower incisors of both burials appear to have been intentionally avulsed. Definite tooth ablation is not observed in any of the limited remains from Block II. Pietrusewsky and Douglas (1993) have documented the occurrence of tooth ablation in late prehistoric and historic Hawaiians. Further discussion of this cultural practice is presented in the comparisons.

Table 13. Oral-Dental Pathology Recorded in the Permanent Teeth of the Block I Burials from Marin Tower (Sides & Jaws Combined).

PATHOLOGY	10002 (F 40-50)	I0010 (F 40-45)	I0016	(F 35-40)	I0003 (M 19-35)
	n/N	%	n/N	%	n/N	%	n/N	%
Peg-shaped teeth	0/22	0.0	0/25	0.0	0/32	0.0	0/28	0.0
Premort. tooth loss	6/28	21.4	2/28	7.1	0/32	0.0	0/32	0.0
Caries								
interprox.	4/22	18.2	0/25	0.0	0/32	0.0	0/28	0.0
occlusal	2/22	9.1	0/25	0.0	0/32	0.0	0/28	0.0
root	0/22	0.0	0/25	0.0	0/32	0.0	0/28	0.0
overall	6/22	27.3	0/25	0.0	0/32	0.0	0/28	0.0
Abscessing								
molars only	3/4	75.0	1/1	100.0	0/12	0.0		
premolars only	0/6	0.0	1/1	100.0	0/8	0.0		
overall	3/19	15.8	2/2	100.0	0/32	0.0		
Alveolar resorp.								
slight	3/17	17.6	1/6	16.7	27/32	84.4		
moderate	14/17	82.4	1/6	16.7	3/32	9.4		
marked	0/17	0.0	4/6	66.7	0/32	0.0		
overall	17/17	100.0	6/6	100.0	30/32	93.8		
Rolled rim								
slight	4/15	26.7	0/2	0.0	5/32	15.6		

Table 13 (cont.).

	10002	(F 40-50)	I0010 (F 40-45)	I0016	(F 35-40)	I0003 (M 19-35)
	n/N	%	n/N	%	n/N	%	n/N	%
Calculus								
slight	16/21	76.2	19/25	76.0	32/32	100.0	23/28	82.1
moderate	3/21	14.3	2/25	8.0	0/32	0.0	0/28	0.0
marked	2/21	9.5	4/25	16.0	0/32	0.0	0/28	0.0
overall	21/21	100.0	25/25	100.0	32/32	100.0	23/28	82.1
Attrition								
enamel	3/22	13.6	10/24	41.7	22/32	68.8	28/28	100.0
dentin	19/22	86.3	12/24	50.0	10/32	31.3	0/28	0.0
root	0/22	0.0	2/24	8.3	0/32	0.0	0/28	0.0
overall	22/22	100.0	24/24	100.0	32/32	100.0	28/28	100.0
Hypoplasia ¹								
slight	3/10	30.0	0/3	0.0	0/12	0.0	2/8	25.0
moderate	0/10	0.0	0/3	0.0	0/12	0.0	0/8	0.0
marked	0/10	0.0	0/3	0.0	0/12	0.0	0/8	0.0
overall	3/10	30.0	0/3	0.0	0/12	0.0	2/8	25.0
Tooth ablation								
max. incisors ²	0/4	0.0	0/2	0.0	0/4	0.0	0/4	0.0
mand. incisors ³	0/4	0.0	0/4	0.0	0/4	0.0	4/4	100.0
all incisors	0/8	0.0	0/6	0.0	0/8	0.0	4/8	50.0
3rd molar agenesis	0/1	0.0	0/2	0.0	0/4	0.0	0/4	0.0

Table 13 (cont.).

	10009 (1	M 40-50)	I0004 ((?sex≈15)	I0011	(?sex 2-4)	BLOC	K I TOTAL
	n/N	%	n/N	%	n/N	%	n/N	%
Peg-shaped teeth	1/18	5.6	0/32	0.0	0/7	0.0	1/164	0.6
Premortem tooth loss	1/24	4.2	0/32	0.0			9/176	5.1
Caries								
interprox.	0/19	0.0	0/31	0.0			4/157	2.5
occlusal	0/19	0.0	0/31	0.0			2/157	1.3
root	2/19	10.5	0/31	0.0			2/157	1.3
overall	2/19	10.5	0/31	0.0			8/157	5.1
Abscessing								
molars only	1/5	20.0					5/22	22.7
premolars only	0/3	0.0					1/18	5.6
overall	1/9	11.1					6/62	9.7
Alveolar resorp.								
slight	0/5	0.0					31/60	51.7
moderate	2/5	40.0					20/60	33.3
marked	3/5	60.0					7/60	11.7
overall	5/5	100.0					58/60	96.7
Rolled rim slight	0/2	0.0					9/51	17.6
Calculus								
slight	15/19	78.9	32/32	100.0			137/157	87.3
moderate	4/19	21.1	0/32	0.0			9/157	5.7
marked	0/19	0.0	0/32	0.0			6/157	3.8
overall	19/19	100.0	32/32	100.0			152/157	96.8

Table 13. (cont.).

	I0009 (N	A 40-50)	I0004 ('	?sex≈15)	I0011	(?sex 2-4)	BLOCK I TOTAL	
	n/N	%	n/N	%	n/N	%	n/N	%
Attrition								
enamel	11/19	57.9	21/32	65.6			95/157	60.5
dentin	6/19	31.8	0/32	0.0			47/157	29.9
root	0/19	0.0	0/32	0.0			2/157	1.3
overall	17/19	89.5	21/32	65.6			144/157	91.7
Hypoplasia ¹								
slight	1/6	16.7	6/12	50.0	0/5	0.0	12/56	21.4
moderate	2/6	33.3	2/12	16.7	4/5	80.0	8/56	14.3
marked	0/6	0.0	4/12	33.3	1/5	20.0	5/56	8.9
overall	3/6	50.0	12/12	100.0	5/5	100.0	25/56	44.6
Tooth ablation								
max. incisors ²	0/2	0.0	0/4	0.0			0/20	0.0
mand. incisors ³	4/4	100.0	0/4	0.0			8/24	33.3
all incisors	4/6	66.7	0/8	0.0			8/44	18.2
3rd molar agenesis	0/3	0.0	0/4	0.0			0/18	0.0

¹N=incisors and canines scored

²N=maxillary incisors scored

³N=mandibular incisors scored

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Table 14. Oral-Dental Pathology Recorded in the Permanent Teeth of the Block II Burials from Marin Tower (Sides and Jaws Combined).

				BL	OCK II				BI	OCK II
PATHOLOGY	I0006 (F 25-35)	I0008 (F	20-25)	I0005 (I	M 35-45)	I0013 (N	ſ <u>≥</u> 50)	Т	OTAL
	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%
Peg-shaped teeth	0/1	0.0	0/19	0.0	0/1	0.0	0/12	0.0	0/33	0.0
Premortem tooth loss	0/1	0.0	0/19	0.0	0/1	0.0	3/20	15.0	3/41	7.3
Caries										
interproximal	0/1	0.0	0/19	0.0	0/1	0.0	0/12	0.0	0/33	0.0
occlusal	0/1	0.0	0/19	0.0	0/1	0.0	1/12	8.3	1/33	3.0
root	0/1	0.0	0/19	0.0	0/1	0.0	0/12	0.0	0/33	0.0
overall	0/1	0.0	0/19	0.0	0/1	0.0	1/12	8.3	1/33	3.0
Abscessing										
premolars only							0/4	0.0	0/4	0.0
overall							0/6	0.0	0/6	0.0
Alveolar resorption										
slight							0/4	0.0	0/4	0.0
moderate							1/4	25.0	1/4	25.0
marked							3/4	75.0	3/4	75.0
overall							4/4	100.0	4/4	100.0
Rolled rim										
overall							0/3	0.0	0/3	0.0

Table 14 (cont.).

				BLC	OCK II				BLC	OCK II
PATHOLOGY	I0006 (I	F 25-35)	I0008 (F 2	I0008 (F 20-25)		M 35-	I0013 (M	≥50)	ТО	TAL
	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%
Calculus										
slight	0/1	0.0	16/19	84.	1/1	100.	10/12	83.3	27/33	81.8
moderate	1/1	100.0	2/19	10.	0/1	0.0	2/12	16.7	5/33	15.2
marked	0/1	0.0	1/19	5.3	0/1	0.0	0/12	0.0	1/33	3.0
overall	1/1	100.0	19/19	10	1/1	100.	12/12	100.0	33/33	100.0
Attrition				A A		^				
enamel	0/1	0.0	10/18	55.	1/1	100.	9/12	75.0	20/32	62.5
dentin	1/1	100.0	0/18	0.0	0/1	0.0	3/12	25.0	4/32	12.5
overall	1/1	100.0	10/18	55.	1/1	100.	12/12	100.0	24/32	75.0
Hypoplasia ¹				,						
slight	0/1	0.0	0/4	0.0	0/1	0.0	2/4	50.0	2/10	20.0
moderate	0/1	0.0	0/4	0.0	0/1	0.0	0/4	0.0	0/10	0.0
marked	0/1	0.0	0/4	0.0	0/1	0.0	0/4	0.0	0/10	0.0
overall	0/1	0.0	0/4	0.0	0/1	0.0	2/4	50.0	2/10	20.0
Tooth ablation										
mand. incisors ²			0/1	0.0			0/4	0.0	0/5	0.0
Third molar agenesis			0/2	0.0			0/1	0.0	0/3	0.0

¹N=incisors and canines scored

²N=mandibular incisors scored

Dental staining is observed in two individuals from Block I (Burials I0011 and I0016). The staining is light brown in color on the outer surface of the anterior teeth in Burial I0016 (35 - 40 year old female). In Burial I0011, a child aged 2 - 4 years, the entire lower portion of the permanent tooth crowns, which were unerupted in the living person, are colored dark brown. Because the development of a tooth involves a matrix phase which is then calcified or mineralized, a stain may be picked up by the matrix from the ground, water, or sediment after burial, and result in a stained tooth. The uniformity of the staining in these teeth and the fact that the permanent first molar crown is completely brown, suggests a systemic cause of the stain. The deciduous teeth are not stained.

Dental stains (Shafer et al. 1986) may be extrinsic, on the outside of the enamel surface, or intrinsic, incorporated into the structure of the enamel. Extrinsic stains include stains from tobacco smoking, a brown stain from salivary liquid, black stain, green-grey stain, which occurs on the lower third of the maxillary anterior teeth in children, and orange stain. Most of these stains are caused by microorganisms which are residing in a deposit on the teeth. Most are easily removable. The light brown stains in the teeth of Burial I0006, are likely to be tobacco stains. While the exact nature of the staining in the teeth of Burial I0011 is not known, possible explanations may include post-depositional staining or an intrinsic dental stain. Intrinsic dental staining is the result of systemic abnormalities which affect the tooth during development. Foremost, and most common of these stains, is the mottled brown enamel of fluorosis, typically caused by abnormally high amount of fluoride in the drinking water. Other developmental disturbances, including hereditary enamel dysplasia (brown stain, poor quality enamel) and congenital fetal anemia (blue/black stain), may result in discoloration of the dental enamel.

The Infracranial Skeleton

Infracranial Measurements

Measurements of the bones from the infracranial skeleton are recorded for each of the adult individuals complete enough to allow measurements. Measurements are available for five (three female, two male) burials from Block I and one (I0013) male from Block II. Some of the measurements are estimates made in the field using a tape measure before the bones were lifted. These latter measures, which are identified in Table 15, are approximations and should be viewed with caution. Due to the incomplete condition and generally poor preservation in these remains, very few measurements could be recorded. Infracranial indices are given in the next table, Table 16. As expected, there is extreme variability in these indices, between sides of the same individual and between individuals from the project area.

Values for the humeral diaphyseal index, which expresses the degree of flattening of the humerus shaft, with a single exception, indicate flattening (platybrachia) in the humeri of the Marin (three female, two male) burials. There is flattening of the upper femoral shaft (platymeric index) in three (two female, one male) individuals for which this index could be recorded. The individuals from Block I generally have strong pilaster development at the femur mid-shaft. Although upon gross inspection, Burial I0013 from Block II appears to have a very strong pilaster, this is not substantiated by the index value obtained for this individual. The platycnemic index, which expresses the degree of flatness of the mediolateral plane of the proximal tibial shaft, could be recorded in only two individuals, both have mesocnemic or non-flattened tibial shafts. The patella module ranges from 30.3 to 36.0 (n=6 sides) in four individuals. These data will be compared with other ethnic groups in the next chapter.

Stature

Several different stature estimates using Polynesian, White, Mongoloid, Mexican and non-ethnic formulae for eight of the adult Marin burials are presented in Table 17. The tallest individual from the project area is Burial I0013 whose estimated stature, using Polynesian formulae, is approximately 5'10" (177.8 cm). The two males from Block I are approximately 2" shorter than Burial I0013. Using Polynesian formulae, the Block I females range in stature from approximately 5'1.5" (156 cm) to 5'4.5" (164 cm). Block II has the shortest (5'1") and the tallest (5'5") female from the project area.

Infracranial Non-metric Traits

Non-metric traits recorded in the infracranial skeleton for seven of the adult Marin burials are presented in Table 18. The data are incomplete for many of these individuals. A ridge, at the site of attachment of the costo-clavicular ligament on the inferior medial border of the clavicle, is observed in two individuals. The supraclavicular foramen is absent in three individuals and present in one side of Burial I0013. The suprascapular notch is enlarged in four scapulae of three individuals. This enlarged condition has been noted previously in Hawaiian skeletal remains (Pietrusewsky and Douglas 1992). The single fovea capitis available for study is oval in shape. Non-metric variation was recorded in the patellae of five individuals. A vastus facet, a small expression in the supero-lateral border of the patella, was found to be universally present in these remains. A vastus notch, where the vastus lateralis tendon inserts on the supero-lateral angle of the patella, occurs in two sides (2/8). Patellar spurs occur in half (4/8) of the patellae from the project area. Squatting facets were observed in the tali of three individuals available for study. The anterior and middle calcaneal facets are two discrete facets in the calcanei for three individuals from Block I. A peroneal tubercle was observed in one calcaneus available for study. The vertebrae were too fragmentary for detailed observations of non-metric variation to be made.

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Table 15. Infracranial Measurements Recorded in the Marin Tower Burials from Blocks I and II.

					BL	OCK I					BL	OCK II ¹
	1000)2 (F) ²	100	10 (F)	I001	6 (F)	1000	3 (M)	100	09 (M)	100	013 (M)
Measurements (in mm)	right	left	right	left	right	left	right	left	right	left	right	left
Clavicle												
Max. length		146*	111*								157*	
Sag. diameter midshaft		9			8**	8**	12**				11**	
Vert. diameter mid.		7			9**	9**	10**				12**	
Circum. at midshaft		28			30**	29**	36**				38**	
Humerus												
Max. length			268*		304*	292*					350*	
Epicondylar breadth							52					
Mid-circumference	62**		55**	55**	57**	55**	62**				71**	
Max. diam. midshaft	21**	21**	19**	19**	20**	19**	21**				24**	
Min. diam. midshaft	14**		15**	14**	14**	14**	15**				17**	
Least circ. distdelt.	55	55	53	53	55	55	56		70	68	68	
Radius												
Max. length	220*	224*	210*	206	216	220	238					
Radial head diameter	22	21	21	21	19	20	20				27	
Sag. diameter midshaft		11	10	10	10	10	11				15**	
Trans. diameter mid.		15	12	13	12	12	13				19**	
Ulna												
Max. length	228*			213*	231*							
Dorsal-volar diameter			16	16	14		17			14		
Trans. diameter			13	14	10		13			14		

Table 15 (cont.).

			1		BLO	OCK I			_		BI	OCK II ¹
	1000	02 (F)	100	I0010 (F)		6 (F)	1000	3 (M)	100	009 (M)	10	013 (M)
Measurements (in mm)	right	left	right	left	right	left	right	left	right	left	right	left
Ulna (cont.)												
Min. circumference			36	36			35					
Femur												
Max. length		430*	335*									
Epicondylar breadth							73	73				
Max. head diameter	39											
Subtro. A-P diameter	21	20	23				23					29
Subtro. trans. diameter	32	32	29				33					37
Midshaft A-P diameter	27**	27**	29**					27**	30**	30**		33**
Midsh. trans. diameter	21**	22**	22**					22**	25**	26**		30**
Circumference midsh.	78**	79**	80**					82**	89**	90**		105**
Γibia												
Max. length								366	366	370		
Max. length less spine								359	360	365		
Max. epi. bread. prox.							67		81	79		
Max. diameter nutrient for.		33							37	38		
Trans. diam. nutrient for.		23							25	25		
Circumference nutrient for.		88							98	100		
Midshaft A-P diameter	26**	27**							32	32		

Table 15 (cont.).

			_		BLO	OCK I					BLOCK II ¹	
	1000	2 (F)	100	I0010 (F)		6 (F)	1000	3 (M)	100	009 (M)	10	013 (M)
Measurements (in mm)	right	left	right	left	right	left	right	left	right	left	right	left
Tibia (cont.)												
Midshaft transverse diameter	20**	18**							22	23		
Circumference midshaft	75**	77**							91			
Fibula												
Maximum length			320*						351	355		
Maximum diameter midshaft		14**	17**	17**		16**	17**		19	19		20**
Patella												
Height		37	43	43			38	36	41	43		
Width		39	45	47			38	36	46			
Thickness		20	19	18			18	19	21	22		
Calcaneus												
Maximum length		80					78	76	78	80		
Maximum breadth								42				
Talus												
Maximum length	52	52					52	52	54	57		
Maximum breadth	41	41					44	43	49	48		
Lumbar Centrum Height	Ant.:	Post.:	Ant.:	Post.:	Ant.:	Post.:	Ant.:	Post.:	Ant.:	Post.:	Ant.:	Post.:
4	24											
5							30					

¹ Very few infracranial measurements were recorded for Individuals I0005, I0006/I0007 and I0008 from Block II and are included in their burial descriptions.

² F=Female, M=Male

^{*} This long bone measurement was estimated in the field using a tape measure.

** This measurement was taken at the estimated midshaft.

Table 16. Infracranial Indices Recorded in the Marin Tower Burials from Blocks I and II.

					BLOG	CK I					BLO	CK II ¹
Index	1000	I0002 (F)		I0010 (F)		I0016 (F)		3 (M)	10009) (M)	I001	3 (M)
	right	left	right	left	right	left	right	left	right	left	right	left
Humeral Robusticity			19.8*									
Humeral Diaphyseal	66.7		78.9	73.7*	70.0	73.7	71.4				70.8	
Radio-Humeral			78.4*		71.1*	75.3*						
Femur Robusticity			15.2***									
Tibia Thickness	76.9**	66.7**							68.8	71.9		
Platymeric	65.6	62.5	79.3									78.4
Pilastric	128.6**	122.7**	131.8**						120.0**	115.4**		110.0**
Platycnemic		69.7							67.6	65.8		
Patella Module		32.0	35.7	36.0			31.3	30.3	36.0			

A single index each was calculated for Individuals I0005 (right patella module, 39.3) and I0008 (left tibial-radial index 67.2*).

This index was calculated using an estimated long limb bone length.

^{**} The midshaft has been estimated.

*** The midshaft and long limb bone length has been estimated.

Table 17. Estimated Statures of the Marin Tower Burials from Blocks I and II.

Burial				BLOCK I: Est	imated Statures Ba	sed on Various Fo	ormulae	
No.	Age	Sex	Bone Used	Non-Ethnic ¹	Polynesian ²	White ³	Mongoloid ³	Mexican ³
10002	40-50	Female	left femur*	5' 4" 162.4±4.5cm	5' 4.5" 164.2±2.0cm	5' 3" 160.3±3.7cm		
I0010	40-45	Female	left radius	5' 0" 152.6±5.0cm	5' 1.5" 156.2±2.1cm	5' 0" 152.6±4.2cm		
I0016	35-40	Female	left radius	5' 2" 157.9±5.0cm	5' 3" 159.7±2.1cm	5' 2.5" 159.2±4.2cm		
10003	19-35	Male	left tibia	5' 6" 167.8±4.2cm	5' 8.5" 173.4±0.7cm	5' 6.5" 169.1±3.4cm	5' 6" 167.3±3.3cm	5' 5" 165.3±3.7cm
10009	40-50	Male	left tibia*	5' 6.5" 169.1±4.2cm	5' 8.5" 174.2±0.7cm	5' 7" 170.6±3.4cm	5' 6.5" 168.7±3.3cm	5' 5.5" 166.8±3.7cm
	· · · · · · · · · · · · · · · · · · ·	<u> </u>	<u> </u>	'				
Burial				BLOCK II: Es	timated Statures Ba	ased on Various F	ormulae	
No.	Age	Sex	Bone Used	Non-Ethnic ¹	Polynesian ²	White ³	Mongoloid ³	Mexican ³
10006	25-35	Female?	left femur**	4' 11.5" 150.7±7.3cm	5' 1" 154.8±4.2cm	4' 9" 149.6±6.3cm		
10008	20-25	Female	left tibia*	5' 4.5" 163.8±4.2cm	5' 5" 165.3±0.7cm	5' 4.5" 164.2±3.7cm		
I0013	<u>≥</u> 50	Male	rt. humerus*	5' 11" 180.7±4.9cm	5' 10" 177.8±2.8cm	5' 10" 178.3±4.1cm	5' 9.5" 177.0±4.3cm	5' 9.5" 176.1±4.2cm

¹ Sjøvold (1990) ² Houghton et al. (1980) ³ Trotter (1970) * Bone length was estimated in the field with a tape measure. ** The long bone length used in stature calculations was estimated from a segment measurement using Steele formulae (1970).

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Table 18. Infracranial Non-Metric Observations Recorded in the Marin Tower Burials from Blocks I and II.

			BLOCK I			BLOCE	K II
Trait	I0002 (F)	I0010 (F)	I0016 (F)	I0003 (M)	I0009 (M)	I0005 (M)	I0013 (M)
Sternum							
sternal aperture			absent				
Clavicle							
costo-clavic. sulcus			L ridge				R & L ridge
supraclavicular for.	*L-		R- L-		R-		R- L+
Scapula							
unfused acrom. epi.			R-				
suprascapular		R & L lg. conc.	R lg. conc.				R lg. conc. L notch
Humerus							
supratrochlear	R- L-	R- L-	R- L-	R-	R- L-		R-
septal aperture	R- L+		R- L-	R-			
Ulna							
trochlear not. shape	L hg indent.		L discrete hg.	R hg indent.			
Innominate							
acetabulum				L fold			
pre-auricular sulcus						R lig. groove	
Femur							
fossa of Allen	L-						
third trochanter				R-			L ridge
fovea capitis	R oval						

Table 18 (cont.).

			BLOCK I			BLO	CK II
Trait	I0002 (F)	I0010 (F)	I0016 (F)	I0003 (M)	I0009 (M)	I0005 (M)	I0013 (M)
Patella							
vastus facet	L+	R+ L+		R+	R+ L+	R+	
vastus notch	L+	R-L-		R- L-	R- L-	R+	
patellar spurs	L+	R+ L+		R+L-	R- L-	R-	
Tibia							
tibial bowing					R moderate L slight		
ant. dist. squat. fac.	L+		R-	R+	R+ L+		
Talus							
talar extension		R medial exten. L med./lat. ex.		R & L lateral extension	R & L medial/ lateral extens.		
talar squatting facet		R & L lateral/ neck facet		R & L lateral facet	R & L lateral/ neck facet		
Calcaneus							
calcaneus facet	R & L double			R & L double	R & L double		
peroneal tubercle				R+			

¹Two individuals from Block II each have a single infracranial non-metric observation recorded: 10008 (F) - absent left supratrochlear spur in humerus, and 10014 (M) - present right third trochanter ridge.

^{*} R=right and L=left

 $[\]begin{array}{lll} R+L+: present \ on \ right \ and \ left \ sides \\ R+L-: \ present \ on \ right, \ absent \ on \ the \ left \\ R-L-: \ absent \ on \ right, \ present \ on \ left \\ R-L-: \ absent \ on \ right, \ left \ not \ available \\ R+: \ absent \ on \ right, \ left \ not \ available \\ L+: \ present \ on \ left, \ right \ not \ available \\ L-: \ absent \ on \ left, \ right \ not \ available \\ \end{array}$

Paleopathology

Paleopathological observations in the skeletal remains from Blocks I and II at the Marin Tower Project area are summarized in this section. Each burial description (presented in Chapter VI) contains detailed comments of the specific observations in that individual. Abnormalities of the dentition have already been discussed above.

Porotic Hyperostosis/Cranial Vault Porosis

Cribra orbitalia is the term used to describe a porotic hyperostosis of the orbital roof, in which small perforations of the cortical bone may coalesce to form larger perforations. The cause of porotic hyperostosis is an erosion of the outer cortical layer by expansion of the inner diplöe, or marrow layer, of the cranial vault. The marrow expansion has been shown to be related to iron deficiency anemia (Stuart-Macadam 1989, 1991). In the subadult, the body may react to an iron deficiency anemia by attempting to expand the amount of red blood cell-producing tissue (i.e. marrow). This reaction does not occur in an adult. Iron deficiency anemia may be caused by acute or chronic blood loss such as in injury or parasite infection, a lack of dietary iron or a failure to absorb the available dietary iron. Iron deficiency anemia is not uncommon in children of weaning age (2 - 4 years) who are making the transition from mother's milk to adult food, who are at risk for infection by intestinal parasites, and may not consume enough iron to keep up with the demands of growth and infection. The anemia is usually transient, and the porosis of the orbital vault will heal or fill in over time. Healed *cribra orbitalia* was noted in a single orbit of Burial I0002, a female aged 40 - 50 years.

A healed, coarse porosis of the cranial vault, which occurs above the temporal line on both parietal bones, above the superior nuchal crest on the occipital bone and on the superior frontal bone, occurs in five of the adult individuals from Marin Tower. Burial I0002 (40 - 50 year old female) from Block I, and two males (Burials I0005 and I0014) and two females (Burials I0006 and I0008) from Block II, all over the age of 20 years, are affected. The porosis is typically coarse, with widely spaced, smooth-edged holes, perforating the outer cortical layer of bone and not exposing the marrow. The cranial vault bones do not appear to be thickened. *Porotic hyperostosis*, which has been linked to iron deficiency anemia, requires that there be marrow thickening of the cranial vault. Although the Marin Tower individuals do not appear to have thickened vault bones, without a radiograph, we cannot be sure. In the absence of cranial vault thickening, an explanation for the occurrence of this coarse cranial vault porosis must be sought elsewhere. The presence of this porosis in so many adult males and females, suggests that it is the result of a relatively common condition, perhaps scalp infection, but the exact cause of the porosis is not known.

Fracture

A single fracture is noted in the fifth lumbar vertebra of Burial I0010, a female aged 40 - 45 years, from Block I. Spondylolysis is a separation of the vertebra at the pars interarticularis, or the narrow space on the vertebral arch which separates the superior articular facets from the inferior ones. The separation may be a fatigue or stress fracture or an acute traumatic fracture (Zimmerman and Kelley 1982, Merbs 1989). The inferior neural arch separates from the vertebral body and superior facets, usually bilaterally. This fracture has been extensively studied in a variety of skeletal populations and has been alternatively linked with a genetic defect and a physiological stress fracture. In the final determination there may be a genetic predisposition or weakness of this region of the vertebra which is then fractured due to a physiological stress (Merbs 1989:171). The fracture frequency increases from age 4 to age 30 - 40, suggesting an age-progressive pattern, and results from a loading of the spine when it is in flexion (Hensinger and MacEwen 1982). Spondylolysis is documented in 5 percent of the general population, and is common in rowers, weight lifters, gymnasts (from doing "back walkovers"), and soldiers who exercise carrying heavy backpacks. There may or may not be symptoms of the fracture depending upon how much the vertebra above "slips" or moves forward, pinching the spinal canal.

Infection

Signs of periostitis, or bone infection, are noted in two individuals from Block I, Burial I0003 and I0010, and one individual from Block II, Burial I0013. Periostitis may be caused by injury to the periosteum or outer covering of the bone or by systemic infection of the bone marrow. Generally, if there are localized signs of infection, for example a small area on a single bone, the inference is that this is the result of an injury to that area. When large areas or multiple bones are involved, a systemic infection is suspected as the cause. Burial I0013, an older male, has periostitis of the right thumb (first metacarpal and proximal phalanx), suggestive of a soft tissue and bony injury to the hand.

Systemic infection may be the explanation for the bone changes observed in Burial I0003, a young adult male, where there are signs of healed reactive bone growth and enlargement of the tibiae and the right ulna. These lesions are healed, suggesting infection earlier in life. These lesions are characteristic of treponemal infection (yaws, syphilis), a spirochete infection which preferentially infects bones which are close to the skin surface. There has been no conclusive evidence of treponemal infection in Hawai'i, prior to Captain Cook's arrival, although yaws is endemic in many Southwest Pacific Islands.

Burial I0010, a female aged 40 - 45 years, has periostitis of the superior surfaces of the right metatarsals, and marrow expansion, thickening and blunting of the anterior tibiae, fibulae, the left femur midshaft, the left patella and the left ulna. The long limb bone surfaces appear healed and remodeled, but without complete resolution of the bony apposition. The metatarsals and patella have new bone formation which is incompletely remodeled. The presence of bone reaction in multiple bones suggests a systemic disease, perhaps treponemal

infection, leprosy, or a metabolic disturbance. Radiographs of the affected bones would have aided in a differential diagnosis.

Occupational Stress Markers

Distal femoral facets, occurring bilaterally on the posterior medial side of the intercondylar notch, are noted in Burial I0003, a young adult male from Block I. This is the location for insertion of the posterior cruciate ligament, which extends from the posterior femur to the posterior tibia, and acts to keep the femur from sliding forward on the tibia when the knee is flexed (Grant 1962:292). Although not specifically described by Kennedy (1989) or Kostick (1963), this imprint is likely to be related to other imprints around the distal femur and proximal tibia resulting from strenuous or habitual flexion of the knee.

VIII: OSTEOLOGICAL COMPARISONS

In this chapter we compare some of the major osteological features of the individuals buried in the two major burial concentrations, Blocks I and II. Following this, further comparisons are made between the burials from the Marin project area and other historic and prehistoric skeletal series from Hawai'i.

The major findings, including sex, age, stature, ethnicity, completeness and preservation for each burial, are summarized in Table 19. The ethnicity determinations found in this table are tentative and based primarily on morphological assessment. Because many of the burials are incomplete and poorly preserved, a judgment was not always possible. Comparisons with other known historic and prehistoric Hawaiian skeletal series will provide a basis for further addressing the ethnic status of these burials. First, however, some comparisons between the individuals buried in Block I and Block II are summarized.

Summary of Block I Osteology

A total of nine individuals are represented in the burials from Block I, five are adults and four are subadult. The subadult burials include two fetuses who died at/or around the time of birth, one child (approximately 2-4 years of age), and one adolescent who died at about 15 years of age. There are three adult females, who were 35 years of age or older at the time of their deaths. Two of the female skeletons (Burials I0002 and I0010) are similar in age. Two adult males are represented, one died as a young adult and the other was between 45-50 years of age at the time of his death. The remains from this block are more complete and much better preserved than those from Block II.

All the remains from Block I are of probable Hawaiian ancestry. Two adult females (Burials I0002 and I0016) may be blood relatives (sisters, or mother and daughter) based on the occurrence of an unusual dental condition seen in one of their incisor teeth. Both individuals were of similar heights (approximately 5'3"-5'4.5"). Fetal remains found in association with each of these burials probably represent their offspring. Burial I0011 (a child) and Burial I0012 (a fetus) are associated with Burial I0002, their presumed mother. Likewise, Burial I0017 may represent the newborn or stillborn fetus of Burial I0016.

Dental enamel hypoplasia, an indicator of childhood physiological stress, occurs frequently in Block I individuals. It is observed in five burials. Dental enamel hypoplasias are not common in prehistoric Hawaiian skeletal remains, but have an increased frequency in the historic period. This may be because of a general lack of adequate nutrition or an increase in childhood disease which happens to correspond to the same period. The poorest dental health occurs in Burial I0002, the oldest individual from this block. The five

remaining adults had generally good dental health, some were completely free of dental caries and abscessing. There is evidence of periodontal disease in most of the adult burials from this block.

Tooth ablation, or the intentional removal of some of the anterior teeth, has been previously reported in Hawaiian remains. Two individuals from Block I, both males, exhibit tooth ablation of all the lower incisors.

Using Polynesian formulae, the range in estimated statures for the three females from Block I is 5'1.5" to 5'4.5". Both Block I males have estimated statures of 5'8.5".

Evidence of possible treponemal (syphilis) infection is found in the skeletal remains of two individuals from Block I, a young adult male and a 40-45 year old female. Osteoarthritis, or degenerative changes in the joint surfaces of the skeleton, are minimally expressed in the Block I remains.

Summary of Block II Osteology

There are six individuals represented in the burials from Block II. Compared with those from Block I, these remains are more often incomplete and of much poorer preservation. Osteological observations are generally limited. Ethnicity could not be determined in most instances due to the fragmentary condition of these remains. With the exception of one very young (6 months to 1.5 years) child, all the burials (five) from Block II were adults at the time of their death, three are males and two are females. Two of the males died between 40 and 45 years of age and the third (Burial I0013) is 50 or more years of age at the time of his death. One of the females is young (20-25) and the other was between 30-35 years of age at the time of death.

Cranial porotic hyperostosis, possibly an indicator of iron deficiency anemia, is observed in the cranial fragments of at least three individuals. Teeth are rarely present in these remains making dental observations difficult or impossible.

Two adult females from Block II, Burials I0006 and I0008, have estimated statures of 5'1" and 5'5", respectively. Burial I0013, the oldest and largest male from either of the two blocks, has an estimated stature of 5'10". This individual has extensive premortem tooth loss and suffered from severe osteoarthritis in the knee and vertebral column. He also had a possible injury to one of his hand/finger joints. There are very few indicators present to determine ethnicity of this individual. Two mandibular indices, two femoral indices, and the relatively tall stature of this individual, are consistent with Hawaiian ancestry. Measurements recorded in the humerus, radius, and femur of this individual are generally greater than comparable measures available for American White males (Jantz and Moore-Jansen 1988) and Hawaiian males (Pietrusewsky et al. 1991), which makes a southern European ancestry seem very unlikely. Although the sex and age-at-death of this individual match the description of Don Francisco Marin, there is little else from the osteological record to suggest

that these are his remains. If Marin was a relatively tall and muscular individual who had suffered a possible hand and knee injury during life and had poor dental health and more than slight arthritis, then this set of remains might be his.

None of the individuals from Block II can be related, with confidence, to any of the other individuals in this Block, nor can they be related to any of the individuals in Block I based on osteological features.

Possible Osteological/Ethnographic Matches

The Marin family members likely to have been buried within the project area are given in Table 20. The ethnographic information is taken from the preliminary report (Goodwin et al. 1992). Using age and sex as the principal criteria, a number of possible osteological/ethnographic matches are proposed. In several instances, the exact age-at-death is not known preventing a match to be made.

Examining individuals from the Marin Tomb area (Block II), only Burial I0013 provides a possible match (based on age and sex) for Don Francisco. The relatively tall stature (5'10") and a few other osteological features, however, would not seem to support this assignment. None of the male burials from Block I provides a good match for Don Francisco. Of the remaining Block II individuals, Burial I0006, a 25-35 year old female, could possibly be Maria Lahilahi, one of Marin's daughters who was 33 years old when she died. Burial I0006 may also be Kaihukuloa, one of Marin's four wives, who lived to be at least 34 years old, although there is no record of when she died. Burial I0015 (a 6-18 month old child) could represent any of Marin's five children who are reported to have died within the first two years of their lives.

Three Block I burials (I0002, I0010, I0016) represent females who were 35 years or older when they died. Two of these (I0002 and I0016) may be been genetically related (mother-daughter or sisters). Any, or all, of these three females could represent one of Marin's four wives. The assignment of possible Hawaiian ancestry to these four burials strengthens this assertion. Burial I0016 is close to the age when Maria Lahilahi, Marin's daughter, is reported to have died, providing another match. Burials I0012 and I0017, newborn or stillborn infants at the time of their deaths, could be any of Marin's five children or his grandson who are reported to have died early in life. Two adult males from Block I, I0003 and I0009, do not match any of the Marin family members likely to have been buried in the project area. Burial I0004, an adolescent at the time of death, might be Francis, Marin's grandson who died in 1850 at an age of 20 years. Burial I0011, a 2-4 year old child, cannot be matched with any other Marin family members.

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Table 19. Summary of Major Findings from Osteological Study of the Marin Tower Burials (Blocks I and II).

Burial	Sex	Age (yrs.)	Stature	Ethnicity	Completeness	Preservation	Noteworthy features
I0002	F	40-50	5'4.5"	Hawaiian?	Complete	Fair/Poor	Cribra orbitalia; cranial vault pitting; benign cyst; incisor fold; enamel hypoplasia; edge-to-edge bite; poor dental health (caries, abscessing, periodontal disease); oval <i>fovea capitis</i> ; slight osteoarthritis
I0003	M	Young adult	5'8.5"	probable Hawaiian	Complete	Good/Poor	Enamel hypoplasia, possible treponemal infection; knee flexion; tooth ablation; good dental health; minimal osteoarthritis
10004	?	~15		Hawaiian?	Complete	Fair/Poor	Enamel hypoplasia, calculus; large suprascapular notch; good dental health
10009	М	40-50	5'5.5"	probable Hawaiian	Incomplete	Good/Poor	Possible tooth ablation; microdontia; enamel hypoplasia; cut marks on femur; lateral curvature of tibiae; slight osteoarthritis; relatively good dental health (caries)
I0010	F	40-45	5'1.5"	Hawaiian/ Polynesian	Partial skull & complete skeleton	Fair/Poor	Tooth staining; possible treponemal infection; metatarsal pathology; spondylolysis of L5; dental health generally good (periodontal disease); moderate osteoarthritis
I0011	?	2-4		Indeterminate	Partial	Good/Fair	Enamel hypoplasia; 'bundle' burial; possible offspring of Burial 10002
I0012	?	fetus-N.B.		Indeterminate	Partial	Fair	Stillborn or newborn infant of Burial I0002
I0016	F	35-40	5'3"	probable Hawaiian	Partial	Good/Poor	Tooth staining; incisor fold like Burial I0002; dental wear facets (overbite?); relatively good dental health; minimal osteoarthritis
I0017	?	fetus-N.B.		Indeterminate	Very incomplete	Fair	Found in pelvic region of Burial I0016, its presumed mother
10005	M?	35-45		Indeterminate	Very incomplete	Poor	Femur periostosis; fused toe phalanges; slight osteoarthritis
I0006	F?	25-35	5'1"	Indeterminate	Fragmentary	Poor	Possible cranial vault pitting; periodontal disease; moderate tooth wear
10008	F	20-25	5'5"	Indeterminate	Complete (in matrix)	Poor	Possible cranial vault pitting; enamel extensions and an enamel pearl
10013	M	≥50	5'10"	Indeterminate	Complete except for skull	Fair/Poor	Metacarpal pathology (injury?); severe osteoarthritis in the knee and vertebral column; premortem tooth loss; caries
I0014	M	35-45		Indeterminate	Very incomplete	Poor	Possible cranial vault pitting
I0015	?	.5-1.5		Indeterminate	In matrix	Poor	Age is based on tooth development and diaphyseal lengths

Table 20. Possible Biological Matches Between Marin Family Members Believed to have been Buried in the Project Area and the Burials from Marin Tower.

				Burials in	
Name	Relation	Sex	Age	Block I	Block II
Don Francisco	Father	M	63 yrs.		I0013
Haiamaui	Wife	F	died 1811	I0002, I0010, I0016	
Micaela	Daughter	F	born 1796		
Camela	Daughter	F	born 1798		
Maria Lahilahi	Daughter	F	33 yrs.	I0016	10006
unnamed	Grandson	M	<1 yr.	I0012, I0017	I0015
Francis	Grandson	M	20 yrs.	10004	
Kaihukuloa	Wife	F	>34 yrs.	I0002, I0010, I0016	10006
Kaualua	Wife	F	>38 yrs.	I0002, I0010, I0016	
Caquerua	Wife	F		I0002, I0010, I0016	
unnamed	Son	M	<2 yrs.	I0012, I0017	I0015
Isabella	Daughter	F	<1 yr.	I0012, I0017	I0015
unnamed	Daughter	F	<2 yrs.	I0012, I0017	10015
unnamed	Son	M	<2 yrs.	I0012, I0017	10015
unnamed	Daughter	F	<1 yr.	I0012, I0017	I0015

Comparative Hawaiian Samples

As a further means to determine the ethnicity and identity of the burials from the project area, comparisons of some of the osteological features observed in the Marin Tower burials with other archaeological samples from Hawaii are now made. Because of the incompleteness of these remains and the generally poor preservation, these comparisons are limited to those aspects of skeletal and dental biology of the Marin sample for which sufficient data are available. Further, because of the extreme paucity of information from the Block II burials, most of these comparisons are restricted to individuals from Block I.

Comparative skeletal series for which data are available are presented in Table 21. Included in these comparative series are seven precontact (pre-1778) and four postcontact Hawaiian series from Hawaii, Maui, Kauaii and Oʻahu. The size of the series ranges from 13 to 1171. The postcontact series are small, numbering less than 30 individuals. Two of the series used in these comparisons, Waiʻanae and Keōpū, contain precontact and contact specimens which are analyzed separately. The 'Anaeho'omalu series represents precontact and early contact specimens which are impossible to segregate, and for that reason, has been kept separate form the other series. With the exception of the series from Keōpū (Hawaiʻi), Mōkapu (Oʻahu) and 'Anaeho'omalu (Hawaiʻi), these data are taken from the unpublished literature. However, most of the comparative data presented in this section are based on a recent synthesis and survey of health and disease in precontact and historic Hawaiian series which utilizes unpublished data (Pietrusewsky and Douglas 1994).

Demographic Comparisons

The very reduced sample size compromises detailed comparisons of the demographic features of the Marin sample. The proportion (4 to 5) of subadults to adults in the Block I burials is the highest reported in Table 22. The under-representation of subadults in the Block II burials approximates several other historic series (namely Kaka'ako, Auhaukea'e) and the historic/prehistoric 'Anaeho'omalu series. The sex ratio (females outnumber males 3:2) reported for Block I burials is the same as that reported for Auhaukea'e. The opposite proportion (3 males: 2 females) for the Block II burials is highly atypical. The larger number of males in this latter block requires explanation. A slightly lower (35.5) mean age-at-death is reported for Block II individuals than in Block I (39.4). Both values approximate historic and prehistoric series presented in this table.

Dental Comparisons

Because teeth generally preserve better than bone, the observations based on dental remains from Block I of the Marin Tower site provide some of the more detailed comparisons made in this section. The sample sizes for most of the historic skeletal series, however, are small and these results should be viewed with caution. Tooth size (Table 23) in the Marin series falls within the range for historic and prehistoric Hawaiian series. Comparative data

for a number of dental non-metric traits are assembled by temporal provenience in Tables 24 (historic) and 25 (prehistoric). Shovel-shaped incisors are uniformly present to some degree in most of the comparative series. One of the highest frequencies of shovelling is recorded in the Marin (Block I) sample. As is typical of most Pacific groups, the degree of shovelling rarely exceeds the slight to moderate level which is true for the Marin (Block I) series. The frequency (14/46 or 30.4 percent) of molar extensions in the Marin (Block I) series matches very closely those reported for the other historic Hawaiian series. Prehistoric Hawaiian series generally have lower levels of molar extensions than the historic series. The frequency of protostylid cusps, an extra cusp in the mandibular molars, is rare or completely absent in most precontact and postcontact Hawaiian series. The incidence of protostylid cusp in the Marin series is consistent with this pattern. Carabelli's cusp, an extra cusp on the lingual aspect of the upper molars is relatively rare in Hawaiian dental series. It is completely absent in two of the historic Hawaiian series and is recorded in 3.6 to 26.1 percent (prehistoric Wai'anae) of the historic and prehistoric teeth examined. No examples of Carabelli's cusps were recorded in the Marin burials.

There are few mandibular molars in the Marin series which are suitable for observing cusp patterns. The Y-4 cusp pattern in the mandibular first molars is comparable to its virtual absence in the much larger Hawaiian series included in this table.

The practice of deliberately extracting the teeth, known as tooth ablation, as a sign of mourning has been documented for Hawaiians (Handy and Pukui 1972). Osteological confirmation and elaboration of this practice among early Hawaiians is provided by Pietrusewsky and Douglas (1993). In this latter study, it is noted that tooth ablation as observed in Hawaiian skeletal series occurs slightly more frequently in males than in females and never in children. The practice is most frequent in late prehistoric and early historic series, such as 'Anaeho'omalu and in the historic Kaka'ako series from O'ahu, and appears to be associated with the *ali'i* power centers. It is known that King Kamehameha I avulsed his teeth upon the death of his wife's mother. Removal of all four lower incisors is the most common pattern of tooth ablation in Hawai'i which appears to be the case for two adult males from Block I.

Oral-Dental Pathology Comparisons

A comparison of enamel hypoplasia in the Marin dental remains (Block I individuals) with other Hawaiian dental series is presented in Table 26. The frequency of occurrence of enamel hypoplasia among the Marin remains is one of the highest reported in the comparative series from Hawai'i, only the incidence from the historic Wai'anae series is higher. Enamel hypoplasias are higher among historic than prehistoric Hawaiian series. Calculus, or calcified tartar build-up, in the Marin remains is closest to the historic series (Table 27). Alveolar resorption, another indicator of periodontal disease, is similarly of an elevated occurrence closest to the prehistoric and 'Anaeho'omalu series. Advanced dental attrition, affecting the dentin and pulp, observed in the Marin series (31.2 percent) is closer to the prehistoric Hawaiian values (44.3 percent) than it is to the historic series(14.8 percent).

Table 21. Comparative Hawaiian Skeletal Series.

Skeletal Series	Location	Size	Dates	Reference
Historic				
Kakaʻako	Oʻahu	28	1853-54	Pietrusewsky et al. 1989
Waiʻanae	Oʻahu	19	1865-1900	Pietrusewsky and Douglas 1990
Auhaukea'e	Hawaiʻi	24	1890-1906	Pietrusewsky and Douglas 1989a
Keōpū	Hawai'i	13	1840-1930	Collins 1986
Marin Tower Blocks I & II	Oʻahu	15	1810-1860	Goodwin et al. 1992
Historic/Prehistoric				
'Anaeho'omalu	Hawai'i	100	prehistoric/historic	Pietrusewsky 1971; Pietrusewsky et al. 1990
<u>Prehistoric</u>				
Mōkapu	Oʻahu	1171	prehistoric	Snow 1974
Kualoa	Oʻahu	42	A.D. 1400 - 1600	Pietrusewsky and Douglas 1989b
Waiʻanae	Oʻahu	14	prehistoric	Pietrusewsky and Douglas 1990
Hā'ena	Kauaʻi	31	prehistoric	Pietrusewsky et al. 1992
Honokahua	Maui	712	A.D. 610 - 1800	Pietrusewsky et al. 1991
Keōpū	Hawai'i	342	A.D. 1330 - 1780	Collins 1986

Table 22. A Comparison of Some Demographic Features of Hawaiian Skeletal Series.

Skeletal Series ¹		o. of adults		o. of lults	No. of	No. of	Adult Sex	Mean Age at
	n	%	n	%	Males	Females	Ratio	Death ²
<u>Historic</u>								
Kakaʻako, Oʻahu	2	9.1	20	90.9	11	9	122.2	34.3
Auhaukea'e, Hawai'i	2	11.1	16	88.9	6	9	66.7	42.4
Wai'anae, O'ahu	1	20.0	4	80.0	1	3	33.3	39.4
Historic Total	5	11.1	40	88.9	18	21	85.7	
Marin Tower Block I	4	44.4	5	55.6	2	3	66.7	39.4
Marin Tower Block II	1	16.7	5	83.3	3	2	150.0	35.5
Historic/Prehistoric								
'Anaeho'omalu, Hawai'i	6	6.0	94	94.0	52	36	144.4	30.6
<u>Prehistoric</u>								
Mōkapu, Oʻahu	307	26.8	838	73.2	398	439	90.7	24.5^3
Kualoa, Oʻahu	10	23.8	31	75.6	16	14	114.3	33.7
Waiʻanae, Oʻahu	1	7.1	13	92.9	5	7	71.4	47.6
Hā'ena, Kaua'i	9	29.0	27	71.0	12	10	120.0	38.3
Honokahua, Maui	278	38.9	434	61.1	143	255	56.1	39.1
Keōpū, Hawaiʻi	75	22.1	265	77.9	113	130	86.9	34.1
Prehistoric Total	680	29.7	1608	70.3	687	855	80.4	

See Table 21 for references
 In adults (> 20 years)
 This figure is taken from the life table constructed by Collins (1986:242)

Table 23. Tooth Summary (TS) Figures for Hawaiian Dental Series (Sexes Combined).

Skeletal Series ¹	Range of N Per Tooth	TS(2) ²
<u>Historic</u>		
Kakaʻako, Oʻahu	12-23	1117.0
Auhaukea'e, Hawai'i	6-20	1053.0 ³
Marin Tower ⁴	7-12	1079.1
Historic/Prehistoric		
'Anaeho'omalu, Hawai'i	7-51	1060.8
<u>Prehistoric</u>		
Honokahua, Maui	282-499	1011.9
Hā'ena, Kaua'i	10-35	1190.4
Kualoa, Oʻahu	20-31	1054.8

¹See Table 21 for references

 $^{^2}TS(2)$ = Tooth summary figure based on summation of cross-sectional areas calculated from mean of each diameter measurement (mean MD x mean BL) for each tooth, right and left sides combined, where N = range from least to maximum number of individual teeth.

³Includes one prehistoric specimen in the tooth summary calculations.

⁴Includes Block I individuals only.

Table 24. Comparison of Dental Traits in Marin Tower and Historic Hawaiian Series (Sides and Sexes Combined).

TRAIT/SERIES ¹		Kaka'ako	Waiʻanae	Auhaukea'e	'Anaeho'omalu	Marin Tower
Shovel-Shaped Max. Incisors	n/N	17/37	8/10	23/27	15/18	12/12
	%	45.9	80.0	85.2	83.3	100.0
Molar Enamel Extensions	n/N	42/94	11/26	26/70	80/195	14/46
	%	44.7	42.3	37.1	41.0	30.4
Protostylid Cusps	n/N	0/54	0/14	0/37	2/102	0/27
	%	0.0	0.0	0.0	2.0	0.0
Carabelli's Cusps	n/N	2/56	0/15	0/38	8/111	0/28
	%	3.6	0.0	0.0	7.2	0.0
Mand. M3 Cusp Pattern	n/N	3/15	3/4	0/4	1/20	1/4
Y5 %		20.0	75.0	0.0	5.0	25.0
Mand. M2 Cusp Pattern +4%	n/N	13/19 68.4	5/5 100.0	5/13 38.4	14/34 41.2	0/5 0.0
Mand. M1 Cusp Pattern Y4%	n/N	0/19 0.0	0/5 0.0	0/16 0.0	3/42 7.1	0/3 0.0

¹See Table 21 for references. ²Observations restricted to Block I individuals only ³Any expression of shovel-shaped incisors

Table 25. Comparison of Dental Traits in Marin Tower and Prehistoric Hawaiian Series (Sides and Sexes Combined).

TRAIT/SERIES ¹		Hā'ena	Honokahua	Kualoa	Waiʻanae	Marin Tower
Shovel-Shaped Max. Inciso	ors n/N	55/58	556/830	34/52	11/13	12/12
	%	94.8	67.0	65.4	84.6	100.0
Molar Enamel Extensions	n/N	15/117	506/2516	63/144	12/43	14/46
	%	12.8	20.1	43.8	27.9	30.4
Protostylid Cusps	n/N	1/76	5/1303	2/73	0/29	0/27
	%	1.3	0.4	2.7	0.0	0.0
Carabelli's Cusps	n/N	2/56	42/1349	8/75	6/23	0/28
	%	3.6	3.1	10.7	26.1	0.0
Mand. M3 Cusp Pattern Y5 %	n/N	1/9 11.1	73/189 38.6	5/19 26.3	0/8 0.0	1/4 25.0
Mand. M2 Cusp Pattern +4%	n/N	16/22 72.7	122/275 44.4	10/25 40.0	7/10 70.0	0/5 0.0
Mand. M1 Cusp Pattern	n/N	0/22	7/259	0/24	0/11	0/3
Y4%		0.0	2.7	0.0	0.0	0.0

¹See Table 21 for references. ²Teeth scored in Block I individuals only. ³Any expression of shovel-shaped incisors.

Table 26. Frequency of Occurrence of Dental Enamel Hypoplasia¹ in Hawaiians.

Skeletal Series ²	n/N	%
Historic		
Kaka'ako, O'ahu	14/99	14.1
Auhaukea'e, Hawai'i	25/93	26.9
Wai'anae, O'ahu	14/31	45.2
Historic Total	53/223	23.8
Marin Tower ³	25/56	44.6
Historic/Prehistoric		
'Anaeho'omalu, Hawai'i	19/80	23.8
<u>Prehistoric</u>		
Honokahua, Maui	102/1718	5.9
Hā'ena, Kaua'i	24/181	13.3
Kualoa, Oʻahu	24/119	17.6
Wai'anae, O'ahu	12/35	34.3
Prehistoric Total	159/2053	7.7

¹ Any expression of hypoplastic defect in canines and incisors ² See Table 21 for references ³ Observations made in Block I individuals only

Table 27. A Comparison of Periodontal Disease and Attrition in Hawaiians.

Skeletal Series ¹	Calcul	us^2	Alveo Resorp		Attriti	Attrition ⁴		
	n/N	%	n/N	%	n/N	%		
<u>Historic</u>								
Kakaʻako, Oʻahu	50/296	16.9	113/274	41.2	27/295	9.2		
Auhaukea'e, Hawai'i	29/239	12.1	69/195	35.4	41/164	25.0		
Waiʻanae, Oʻahu	9/85	10.6	60/97	61.9	13/89	14.6		
Historic Total	88/620	14.2	242/566	42.8	81/548	14.8		
Marin Tower ⁵	15/157	9.6	27/60	45.0	49/157	31.2		
Historic/Prehistoric								
'Anaeho'omalu, Hawai'i	84/445	18.9	217/443	49.0	125/438	28.5		
<u>Prehistoric</u>								
Honokahua, Maui	489/7167	6.8	3721/7194	51.7	3456/7365	46.9		
Hā'ena, Kaua'i	23/427	5.4	28/297	9.4	109/442	24.7		
Kualoa, Oʻahu	13/428	3.0	84/303	27.7	128/438	29.2		
Wai'anae, O'ahu	4/116	3.4	40/106	37.7	22/141	15.6		
Prehistoric Total	529/8138	6.5	3873/7900	49.0	3715/8386	44.3		

See Table 21 for references.
 Includes calculus deposits scored as moderate and marked only.
 Includes expressions of alveolar resorption scored as moderate and marked only.
 Includes wear scored as reaching the dentin (moderate), pulp and root only.
 Observations made in Block I individuals only

Premortem tooth loss (Table 28) in the Marin Tower series is of relatively low frequency (5.1 percent). The only other sample which is lower is the Kaka'ako series. The frequency of dental caries in the Marin sample is one of the lowest of any series reported in Table 28. Dental caries are generally more frequent in the prehistoric (14.0 percent) series than in the historic series (12.0 percent). In this regard, the Marin series is closest to the historic series. The Marin dental series has one of the highest (9.7 percent) frequencies of dental abscessing in the samples compared, it is closer to the historic (8.9 percent) and prehistoric (11.5 percent) Wai'anae series. Overall, the oral-dental health among the Marin sample is most similar to the historic Hawaiian series.

Infracranial Indices

The number of indices which could be calculated in the Marin burials are extremely limited. Comparisons using two male and three female individuals from Block I are presented in Tables 29 to 32. Comparing four indices, the largest number available for the Marin burials, with historic and prehistoric Hawaiian series demonstrate few significant differences for the shape of the femoral mid-shaft, proximal tibia and humerus. The size of the patella is similar throughout these series. The infracranial indices reported for the females from the Marin project area are, with the exception of the pilastric index, similar to historic and prehistoric female Hawaiians.

Stature Comparisons

A comparison of estimated stature of the Marin burials with other Hawaiian series is presented in Table 33. These estimates are based on two male and three female individuals from Block I. The average (173.8 cm) male stature for the Marin site is similar to other historic Hawaiian series. The average female stature (160 cm) for the female Marin burials is similar to other estimated female Hawaiian statures given in the same table. The Marin females closely approximate female Hawaiians measured by Sullivan (1927) living ca. 1920.

Infracranial Non-metric Variation

Comparing the non-metric variation recorded in the infracranial skeletons from the Marin (Block I) Tower project with several Hawaiian series (Table 34) reveals few differences. The frequencies of occurrence of *costo-clavicular* development, suprascapular foramen, septal aperture and patellar spurs in the Marin series corresponds closely to those reported in the comparative series. *Vastus* notch, *vastus* facet, and tibial and talar squatting facets are equally common throughout these series. The elevated presence of a large suprascapular concavity in the Marin series matches that reported in the historic burials from Auhaukea'e. The Marin series differs from all remaining series is the high incidence (100 percent) of two separate calcaneal facets.

Table 28. Comparison of Oral-Dental Pathology in Hawaiians.

	Premortem 7	Tooth Loss	Cario	es	Abscess	ing
Skeletal Series ¹	n/N	%	n/N	%	n/N	%
<u>Historic</u>						
Kaka'ako, O'ahu	1/182	0.5	35/298	11.7	8/317	2.5
Auhaukea'e, Hawai'i	26/225	11.6	28/248	11.3	5/210	2.4
Wai'anae, O'ahu	24/116	20.7	13/85	15.3	8/90	8.9
Historic Total	51/523	9.8	76/631	12.0	21/617	3.4
Marin Tower ²	9/176	5.1	8/157	5.1	6/62	9.7
Historic/Prehistoric						
'Anaeho'omalu, Hawai'i	92/1165	7.9	19/437	4.3	49/890	5.5
<u>Prehistoric</u>						
Honokahua, Maui	852/8897	9.6	985/7309	13.5	381/7629	5.0
Hā'ena, Kaua'i	61/571	10.7	92/443	20.8	15/381	3.9
Kualoa, Oʻahu	29/455	6.4	58/397	14.6	29/385	7.5
Wai'anae, O'ahu	34/214	15.9	25/143	17.5	18/156	11.5
Prehistoric Total	976/10137	9.6	1160/8292	14.0	443/8551	5.2

¹ See Table 21 for references ² Observations restricted to Block I individuals only

Table 29. Comparison of Infracranial Indices in Male Historic Hawaiian Series.

Index/Series ¹		Kaka'ako	Auhaukea'e	Marin Tow	er (Block I)
				I0003	10009
Humeral Diaphys	eal R	78.0†	76.2	71.4	
	L	78.9†	74.1		
Pilastric	R	118.8	114.6		120.0
	L	114.5	116.1		115.4
Platycnemic	R	62.5	69.6		67.6
	L	63.1	78.9		65.8
Patella Module	R	37.0	37.7	31.3	36.0
	L	36.0	38.0	30.3	

See Table 21 for references
 Recalculated for this study using the reported means (Pietrusewsky et al. 1989)

Table 30. Comparison of Infracranial Indices in Female Historic Hawaiian Series.

Index/Series ¹		Kakaʻako	Auhaukea'e	Marin Tower (Block I)			
				10002	I0010	I0016	
Humeral Diaphyseal	R	72.5†	76.8	66.7	78.9	70.0	
	L	75.8†	75.6		73.7*	73.7	
Radio-Humeral	R	76.5	74.8		78.4*	71.1*	
	L	75.2	76.8**			75.3*	
Platymeric	R	77.6	74.4	65.6	79.3		
	L	77.8	72.8	62.5			
Pilastric	R	113.3	113.5	128.6	131.8		
	L	112.8	117.7	122.7			
Platycnemic	R	70.3	67.5				
	L	72.9	70.8	69.7			
Patella Module	R	31.8	31.6**		35.7		
	L	31.4	31.1**	32.0	36.0		

See Table 21 for references

[†] Recalculated for this study using the reported means (Pietrusewsky et al. 1989)

This index was calculated from one or more bone lengths estimated in the field using a tape measure.

** Includes one prehistoric individual

Table 31. Comparison of Infracranial Indices in Male Prehistoric Hawaiian Series.

Index/Series ¹		'Anaeho'omalu	Mōkapu	Kualoa	Hāʻena	Honokahua	Marin Tow	ver (Block I)
							10003	10009
Humeral Diaphyseal	R	78.1 ²	75.3	76.8	80.2	77.8	71.4	
	L	79.9 ²	75.0	80.5	77.4	77.0		
Pilastric	R	116.1	119.2 ³	119.2	114.0	120.5		120.0
	L	116.0	117.3 ³	110.2	114.3	119.0		115.4
Platycnemic	R	66.0	67.0	69.6	70.6	64.2		67.6
	L	65.0	65.0	72.1	71.5	64.0		65.8
Patella Module	R	35.8		34.4	36.1	35.6	31.3	36.0
	L	35.8		34.4	36.2	35.7	30.3	

See Table 21 for references
 Recalculated using the reported means (Pietrusewsky et al. 1990)
 Recalculated using the reported means (Snow 1974)

Table 32. Comparison of Infracranial Indices in Female Prehistoric Hawaiian Series.

Index/Series ¹		'Anaeho'omalu	Mōkapu	Kualoa	Hāʻena	Honokahua	Marir	Marin Tower (Block I)	
							10002	10010	I0016
Humeral Diaphyseal	R	73.7 ²	73.2	65.9	80.2	73.3	66.7	78.9	70.0
	L	75.0^2	74.6	72.5	78.2	74.3		73.7*	73.7
Radio-Humeral	R	75.6	76.0	78.1	75.0	75.7		78.4*	71.1*
	L	76.8	76.0	79.1	75.9	75.9			75.3*
Platymeric	R	82.4	70.0	70.3	66.4	77.4	65.6	79.3	
	L	82.2	69.0	72.6	68.8	76.6	62.5		
Pilastric	R	118.0	117.2 ³	110.6	121.2	119.3	128.6	131.8	
	L	118.1	115.7 ³	113.6	122.6	118.3	122.7		
Platycnemic	R	67.4	72.0	75.1	72.4	68.8			
	L	66.5	69.0	73.0	69.9	68.2	69.7		
Patella Module	R	32.5		33.1	32.5	32.2		35.7	
	L	32.6		33.8	32.2	32.3	32.0	36.0	

See Table 21 for references
 Recalculated using the reported mean (Pietrusewsky et al. 1990)
 Recalculated using the reported mean (Snow 1974)
 This index was calculated from one or more bone lengths estimated in the field using a tape measure.

Table 33. Comparison of Stature (in cm) in Historic and Prehistoric Hawaiians.

Skeletal Samples/Sex ¹	N	Average	Minimum	Maximum
Historic Samples - Males				
Kaka'ako, O'ahu	10	173.4	165.9	178.4
Auhaukea'e, Hawai'i	4	173.9	170.8	175.8
Waiʻanae, Oʻahu	1	170.3		
Keōpū, Hawaiʻi	7	176.5	173.0	182.4
Marin Tower ²	2	173.8	173.4	174.2
Hawaiians ca. 1920 ³	204	169.5		
Prehistoric Samples - Males				
'Anaeho'omalu, Hawai'i	40	173.5	162.1	179.6
Keōpū, Hawaiʻi	31	172.0	162.3	176.8
Honokahua, Maui	100	173.3	164.7	182.0
Hā'ena, Kaua'i	10	171.8	168.0	176.5
Mōkapu, Oʻahu ⁴	75	172.9	162.1	181.5
Kualoa, Oʻahu	9	171.6	166.7	180.5
Wai'anae, O'ahu	4	173.1	167.3	179.4
Historic Samples - Females				
Kaka'ako, O'ahu	8	162.4	160.1	165.2
Auhaukea'e, Hawai'i	7	158.3	165.9	163.6
Wai'anae, O'ahu	3	164.5	159.1	169.4
Keōpū, Hawai'i	5	166.2	159.4	177.9
Marin Tower ²	3	160.0	156.2	164.2
Hawaiians ca. 1920 ³	173	159.0		
Prehistoric Samples - Females				
'Anaeho'omalu, Hawai'i	27	162.1	147.0	169.0
Keōpū, Hawai'i	45	161.8	142.4	170.3
Honokahua, Maui	221	163.1	149.8	172.0
Hā'ena, Kaua'i	8	162.0	157.0	167.8
Mōkapu, Oʻahu ⁴	115	158.1	145.0	175.0
Kualoa, Oʻahu	9	162.5	158.3	165.4
Wai'anae, O'ahu	4	162.0	159.7	164.0

See Table 21 for references
 Individuals from Block I only
 Sullivan (1927)
 All statures calculated using Polynesian formulae (Houghton et al. 1975) except Mōkapu.

Table 34. Comparison of Infracranial Non-Metric Variation in Hawaiian Skeletal Series.

Trait/Series	,1	Marin Tower	Auhaukea'e	Kaka'ako	'Anaeho'omalu	Kualoa	Honokahua	Hā'ena
Costo-clavicular ridge/sulcus	n/N	3/3	17/19	16/22	39/47	13/19	392/558	15/28
	%	100.0	89.5	72.7	82.9	68.4	70.3	53.6
Supraclavicular foramen	n/N	1/6	3/18	4/24	6/53	3/27	94/586	6/29
	%	16.7	16.7	16.7	11.3	11.1	16.0	20.7
Suprascapular large concavity	n/N	4/5	8/11	5/15	15/43	1/5	129/456	7/15
	%	80.0	72.7	33.3	34.9	20.0	28.3	46.7
Supratrochlear spur	n/N	0/10	0/16	0/29	0/90	0/22	22/572	0/31
	%	0.0	0.0	0.0	0.0	0.0	3.9	0.0
Septal aperture	n/N	1/5	2/18	1/13	20/91	3/22	169/580	12/31
	%	20.0	11.1	7.7	22.0	13.6	29.1	38.7
Vastus facet	n/N	7/7	9/12	8/17	41/49	7/20	349/554	31/33
	%	100.0	75.0	47.1	83.7	35.0	63.0	93.9
Vastus notch	n/N	2/8	4/15	4/17	6/49	6/21	106/561	10/33
	%	25.0	26.7	23.5	12.2	28.6	18.9	30.3
Patellar spur	n/N	4/8	1/13	2/17	20/49	4/22	202/562	17/34
	%	50.0	7.7	11.8	40.8	18.2	35.9	50.0
Tibial squatting facet	n/N	3/5	16/16	18/22	77/77	20/20	537/559	24/26
	%	60.0	100.0	81.8	100.0	100.0	96.1	92.3
Talar squatting facet	n/N	6/6	13/13	18/21	67/67	25/27	550/566	34/35
	%	100.0	100.0	85.7	100.0	92.6	97.2	97.1
Calcaneus double facet	e n/N	6/6	1/12	10/23	17/61	4/20	198/576	16/33
	%	100.0	8.3	43.5	27.9	20.0	34.4	48.5

¹ See Table 21 for references

Paleopathology Comparisons

Again, the relatively small sample size of the Marin Tower Project and the poor preservation of the remains (especially Block I individuals) makes it difficult to draw many conclusions from a comparative discussion. The paleopathological findings in the Marin Tower remains will be compared with similar findings in other skeletal samples in the hope of offering some perspective.

Cribra Orbitalia

Cribra orbitalia in the Marin sample is restricted to a single eye socket, in an adult female, which exhibits this leading indicator of iron deficiency anemia. *Cribra orbitalia* has been noted in adults in both prehistoric and historic Hawaiian series, in a frequency ranging from 6.1 to 75.0 percent (Pietrusewsky and Douglas 1994). There appears to be an increase in the occurrence of this ill health indicator in adults from prehistoric to historic times.

The diffuse, coarse, healed porosis of the cranial vaults noted in five of the adults from Marin Tower is of unknown etiology. Similar cranial porosis has been noted in prehistoric Hawaiian skeletal series (Kualoa) as well as postcontact skeletal series ('Anaeho'omalu). In all cases it is observed in middle-aged adults, is healed and is not associated with an expansion of the diplöe or medullary cavity.

Fracture

The only evidence of trauma in the remains from Marin Tower is *spondylolysis* of the fifth lumbar vertebra. *Spondylolysis* is not uncommon in prehistoric and historic Hawaiian skeletal remains, but the frequency of occurrence of this fracture is directly affected by the skeletal preservation at the site. The frequency of *spondylolysis* (affected/number of lumbar vertebrae observed) in the Marin Tower Block I remains is 1/3 (33.3 percent, observed in Burial I0010), and in Block II, 0/5 (all observations in Burial I0008). Thus, the overall frequency is 1/8 lumbar vertebrae (12.5 percent) but most of the vertebrae were not preserved. *Spondylolysis* in prehistoric Hawaiian remains is completely absent (Kualoa) or ranges from 1.5 percent (Honokahua) to 5.3 percent in the historic/prehistoric sample from Wai'anae. There were two males in the historic Auhaukea'e series (4.8 percent) with *spondylolysis*.

Infection

Although initial interpretation of Hawaiian skeletal remains focused on the general absence of bony infections (Snow 1974), additional skeletal samples and more recent analyses have documented the presence of nonspecific periostitis, osteomyelitis, tuberculosis

and treponemal disease in Hawaiian remains. There are many more infectious diseases which do not affect bone (e.g., measles, plague) than there are those that do, effectively narrowing the diagnostic possibilities when dealing with skeletal remains. Nonspecific infections, or those related to soft tissue injury or trauma, like that noted in the thumb of Burial I0013, are noted in almost all skeletal series.

Two individuals in the Marin Tower sample appear to exhibit osseous changes similar to those found in treponemal infection. Treponemal infection was also noted in the historic series recovered from Kakaʻako and the large prehistoric and likely early contact series from Honokahua, Maui. The presence of these bony lesions reflects the survival of the individual past the stage of initial infection and the establishment of an immunological response to the infectious agent.

The presence of pathological lesions in the skeletal remains from Marin Tower project area is not unusual and reflects the highly stressful time of the postcontact period. The exact cause of death cannot be determined in any of the remains, but is suggested to have been childbirth in at least two females and two fetuses. Other individuals lived to middle and old age and are likely to have died of an acute infectious illness such as measles, influenza, cholera or plague.

Conclusion

A total of 15 historic burials, from two major concentrations: Blocks I and II, were identified in the remains from the Marin Tower property. Block II, the presumed location of the Marin family plot, contained the burials of five adults (three male, two female) and a child (1-2 years). The remains from this block were greatly disturbed and incomplete making definite assignment of ethnicity inconclusive. The better preserved burials from Block I include five adults (two males, three females), an adolescent, a child and two fetuses. Two adult females from Block I may have been close relatives (mother-daughter or sisters), and both may have died while giving birth. Most of the Block I burials are of probable Hawaiian ancestry.

Using osteological criteria and the historic documentation, several possible matches between the Marin family members believed to have been buried on the property and the exhumed burials are proposed. Burial I0013, a 50-55 year old male, from Block II is the only possible match for Don Francisco Marin. However, the robustness of this skeleton, tall stature and several skeletal features that suggest Hawaiian ancestry would not seem to fit what is known of Marin. Two other burials from Block II provide possible matches with Marin's children and/or one of his wives. Several individuals from Block I may represent one of Marin's four wives and any of his eight children likely to have been buried on the property. None of the burials from the project area can be unequivocally assigned to any of the Marin family members although the possible choices can be narrowed to one or two burials in a few cases.

Due to the generally poor preservation, comparisons of the Marin Tower burials with other Hawaiian skeletal series are generally limited to the burials from Block I. The reduced sample size of the latter and some of the comparative series allow only tentative conclusions to be made. Several dental features (e.g., shovel-shaped incisors, molar enamel extensions, Carabelli's cusp.) observed in the Marin Tower burials are consistent with precontact and postcontact Hawaiian skeletal series. One cultural behavior associated with the ritual of mourning, observed in at least two of the Marin Tower burials from Block I, is further consistent with Hawaiian cultural practices in the late prehistoric/early historic period.

The Marin Tower teeth have one of the highest frequencies of hypoplastic defects, an indicator of physiological stress, recorded in Hawaiian skeletal series. Overall, the dental health of the Marin Tower sample is most like the historic Hawaiian series. Infracranial proportions and stature in the Marin Tower sample closely approximate historic Hawaiian series. Likewise, the frequencies of occurrence of non-metric traits in the skeleton are similar to the comparative series.

Evidence of paleopathology in the Marin Tower sample includes an indicator of iron deficiency anemia, cranial vault porosis, fracture of the fifth lumbar vertebra, and bone infection, possibly attributable to a treponematosis. These examples of pathology are consistent with other postcontact skeletal series from Hawai'i, a time when the general population was experiencing considerable stress.

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APPENDIX A: MEMORANDUM OF AGREEMENT

MEMORANDUM OF AGREEMENT

THIS MEMORANDUM OF AGREEMENT is between the City and County of Honolulu, a municipal corporation of the State of Hawaii, the principal place of business and mailing address of which is Honolulu Hale, 530 South King Street, Honolulu, Hawaii 96813 ("City") and the undersigned, descendants of Don Francisco de Paula Marin ("Descendants") who are all residents of the City and County of Honolulu.

The purpose of this instrument is to state the agreement that the City has reached with the Descendants and to memorialize the good faith representations and commitments of the City and the Descendants with regard to their wishes and conditions related to the respectful treatment in the removal and reinterrment of the human remains ("Remains") believed to be those of Don Francisco De Paula Marin and members of his family found on the site of the City's Marin Tower Housing project ("Project").

The City and the Descendants represent to one another and agree as follows:

- 1. The Project consists of a mixed use facility containing 216 residential apartment units, approximately 17,264 square feet of commercial space, and 411 parking stalls in a 28 story structure situated on a parcel of real property in the City and County of Honolulu bounded by Nimitz Highway, King Street, Smith Street, and Maunakea Street described on the tax maps (Oahu) as tax map key: 1-7-2: 3, 4, and 5.
- 2. Within the parcel of real property being developed, on the corner of Nimitz Highway and Smith Street, an area approximately sixteen feet by twenty feet will remain clear of physical improvements associated with construction of the Project, so as to permit reinterrment of the Remains. The Burial Site is shown on the map which is marked Exhibit A, which exhibit is attached to this instrument and made a part of it.
- 3. The Remains will be reinterred within the Burial Site and shall reflect original associations, pursuant to Exhibit B.
- 4. The Archaeologists and all other personnel who will be involved in the recovery of the Remains and the reinterrment of the Remains within the Burial Site will take part in a consecration ceremony so that they all will be cleansed and focused.
- 5. The "Procedures for Treatment of Human Skeletal Remains," dated May 4, 1992, prepared by the International Archaeological Research Institute, describes in detail the specific treatment of the Remains by the City and all persons involved in the recovery of the Remains and their reinterrment. A copy of those procedures is marked Exhibit B, which exhibit is attached to this instrument and made a part of it.

- 6. The Descendants may monitor the recovery of the Remains and their reinterrment.
- 7. The City and Descendants will cooperate in planning the improvement, landscaping, and maintenance of the Burial Site and shall determine those plans by November 1, 1992. The City will provide assistance from its Department of Housing and Community Development and its Project consultants to assist in the determination of those plans.
- 8. The City, with the assistance of its Office of Culture and the Arts, will design and construct an appropriate commemorative display at the Project site in order to inform and educate the public of the early contact period and the contributions of Don Francisco de Paula Marin. The Descendants shall participate in the determination of the manner of display. The City will consult with the Office of Hawaiian Affairs and the State Office of Historic Sites in regard to the display.
- 9. All expenses incurred with regard to the implementation of the plans as stated in paragraphs 8. and 9., above, shall be paid by the City.
- 10. The City and all persons executing this instrument having agreed on a solution to the problems and issues confronting them pertaining to the recovery and reinterrment of the Remains and having executed this instrument indicating their agreement with the statements made above, the City may proceed and shall proceed with its Project described in paragraph 1., above.
- 11. The statements of agreement included in this instrument and the exhibits attached to it will not be substantially changed or amended without the consent of the Descendants, whose signatures appear on this document or their designated representatives.
- 12. The City acknowledges that all the parties signing as a descendant to this agreement are likely genetic descendants of Don Francisco de Paula Marin.

The City and the Descendants exempts, 1992.	cuted this instrument on
	CITY AND COUNTY OF HONOLULU
	By Its Department of Housing and Community Development
	By Line and Its Director
DESCENDANTS:	
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Enilye 3 dvoracet	44
Slice MXM. Senton	
4mg	
Tholdener H. Much.	

Exhibit B, Page 1 May 5, 1992

MARIN TOWER PROJECT

Procedures for Treatment of Human Skeletal Remains

Goals

- To disinter burials located in the Marin Tower Project area in a process acceptable to the Marin family descendants.
- 2. To determine the number of individuals present in the family burying ground. Given the degree of disturbance in this area, we are not sure how many individuals are there.
- 3. To determine the sex and age (at death) of each individual.
- 4. To determine ethnic identity of the interred individuals, if possible. Are they Caucasian (Spanish), Polynesian (Hawaiian), Mongoloid (Chinese), or a mixture of one or more ethnic groups?
- 5. To determine the general state of health (at death) of each individual.
- 6. The purposes of the aforementioned goals are:
 - to be able to re-unite scattered skeletal remains with the appropriate individual;
 - b. to determine whether one of the individuals is Don Francisco de Paula Marin:
 - c. and to make reasonable inferences about whether any or all the individuals are related by blood to Marin, are likely to be kokua (servants) to Marin, or are completely unrelated to Marin (for example, Chinese individuals from a later time period).

Procedures:

1. An awning will be erected first so that the remains will not be exposed to the sun or other elements. Another blessing will be performed prior to the start of excavation. Careful and respectful excavation and removal of the skeletal remains and associated artifacts and placement of the remains and artifacts in plain, individual appropriately sized wooden (preferably koa) containers.

Exhibit B, Page 2 May 5, 1992

The remains will be transported to the IARII laboratory. Scattered remains not associated with any individual will be placed in an individual container.

- 2. the remains will be carefully dry-cleaned with soft brushes. Some of the remains may have hard, muddy deposits adhering the bone; if necessary in such cases, clear water will be used to clean them.
- The scattered remains will be laid out and sorted.
- 4. The discrete individuals will be laid out in correct anatomical relationship.
- 5. Measurements of the primary diagnostic skeletal remains—the skull, long bones, and teeth—will be made.
- 6. Observations for sex and age will be recorded.
- 7. Observations on morphology—ethnic identity and relatedness—will be recorded.
- 8. Observations on the general state of health will be recorded.
- 9. A written report on the results of the osteological examination will be prepared and made available to family members, along with the basic archaeological report. Access and use of the osteology report will conform to the normal legal policy and procedures of the State Historic Preservation Division, Department of Land and Natural Resources. All associated burial items will be reinterred with the individual. As a matter of policy, the State consults with the family before allowing interested parties access to such reports.
- 10. At the conclusion of the analysis, each individual will be wrapped in kapa cloth, or other appropriate material as defined by the Marin descendants, and placed in an appropriate container as described in Paragraph 1 above. They will be stored in the City and County Archives until reinterrment. Given the construction schedule for the new building, reburial will take place within two years. The descendants shall be notified prior to reinterrment. Appropriate reinterrment services shall be conducted as determined by the family.

Other Considerations:

1. While the skeletal remains are in the IARII laboratory, we will make sure they are not exposed to direct sunlight. At the end of every working day, the remains will be re-boxed so that they do not sit out. The remains will be visible and accessible only to those who are working with them.

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- 2. In special cases, it might be desirable to have certain noninvasive, nondestructive procedures such as an X-ray conducted to elicit specific information about a particular individual. In such cases, IARII will seek special permission from the family and the Oahu Burial Council before any procedure not mentioned above is undertaken.
- 3. Members of the family, the Oahu Burial Council, or their representatives are invited to visit the IARII offices and laboratory to insure that the above procedures are being followed—or simply if there is an interest in how archaeologists work after the field excavations are complete.
- 4. As a general policy to comply with Federal regulations and professional ethical standards, photography is used as a recording tool for preserving information for the better understanding of the human condition now and for future generations. At the request of the family, however, for the Marin Tower Project, photographs of the human skeletal remains will not be taken.

APPENDIX B:

THE BURIAL ARTIFACT CATALOG

Block I Individuals

Table B1. Individual I0002, Feature 9, Excavation Units 34-36, Date range: ca. 1820-ca. 1850.

CAT#	FLD CAT#	ART# DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO. WI
38T	1200	Glass: Beverage: case bottle: fragment:: green::				1
114	1114	Glass; Beverage; case bottle; fragment;;; green;;				1
114	1114	Glass; Beverage; small bottle; base?;; ereen;;;				1
lT	1201	Metal; Iron;; Carpentry; nail; fragment;;;; y				1
,20T	1201	Metal; Iron;; Carpentry; nail; fragment;;;; -				4
;	1201	Metal; Iron;; Carpentry; nail; fragment; probably cut;				2
ŧΤ.	1201	Metal; Iron;; Carpentry; nail; complete;;;; y				1
ΙT	1201	Metal; Iron;; Carpentry; nail; complete; probably cut;				1
T	1201	Metal; Iron;; Carpentry; nail; complete; probably cut;				1
	1201	Metal; Iron;; Carpentry; nail; fragment;;;; y				9
	1201	Metal; Iron;; Carpentry; nail; fragment;;;; -				10
lΤ	1201	Metal; Iron;; Carpentry; nail; fragment;; composite w				1
3T	1201	Metal; Iron;; Carpentry; coffin nail; fragment; cut;;				
4T	1200	Metal; iron;; Carpentry; nail; fragment;;;; -	;;;			2
114	1114	Metal; Iron;; Carpentry; nail; fragment;;;; y	;;;			1
114	1114	Metal; Iron;; Carpentry; nail; fragment;;;; -	;;;			4
3T	1200	200/117 Metal; Iron;; Carpentry; nail; fragment;; composite w	ith wood;;			1
7T	1200	Bone; unknown;; Unidentified; modified bone?; polishe				1
2T	1200	Wood; Charcoal;; Thermal product;; fragments;; -	;;;			
6T	1200	Wood; Charcoal;; Thermal product;; fragments;; -	;;			4
114	1114	Wood; Charcoal;; Thermal product;; fragments;; -	;;;			
PΤ	1200	Unidentified stone; unknown;; Unidentified; manuport;	waterworn pebble		1.5-2 cm	5
14	1114	Unidentified stone; unknown;; Unidentified; manuport;	waterworn pebble;;		4 cm	1
114	1114	Unidentified stone; unknown;; Unidentified; manuport;	waterworn pebble;;		0.5-1 cm	3
PΤ	1200	Unidentified stone; unknown;; Unidentified; manuport;	waterworn pebble		2.5-3	1
14	1114	Unidentified stone; unknown;; Unidentified; manuport;	waterworn pebble;;		2-2.5	3
114	1114	Unidentified stone; unknown;; Unidentified; manuport;	waterworn pebble;;		1-1.5 cm	17
7T	1200	Igneous; basalt;; Lithic; debitage; flake;;;;	;;;			2
114	1114	Igneous; basalt;; Lithic; debitage; flake;;;;	;;;			9
14	1114	Igneous; basalt;; Unidentified; manuport; waterworn pel			2-2.5 cm	4
PΤ	1200	Igneous; basalt;; Unidentified; manuport; waterworn pel			2.5-3 cm	3
T	1200	Igneous; basalt;; Unidentified; manuport; waterworn pel			1-1.5 cm	5
114	1114	Igneous; basalt;; Unidentified; manuport; waterworn pel			1-1.5 cm	19
114	1114	Igneous; basalt;; Unidentified; manuport; waterworn pel			2.5-3 cm	2
T	1200	Igneous; basalt;; Unidentified; manuport; waterworn pel			1.5-2 cm	7
14	1114	Igneous; Volcanic glass;; Lithic; debitage; fragment;				1

Table B2. Individual I0003, Feature 8, Excavation Units 23, 27, 33, and 37, Date range: ca. 1830-ca. 1840.

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO.	WT.
1116	1116		Ceramic; Earthenware; Pearlware; Flatware; unidentified; sherd; blue & white; blue transfer print				1	
1116	1116		Ceramic; porcelain; Chinese Export; Hollowware; bowl; base sherd;;; blue-on-white				2	
1116	1116		Ceramic; porcelain; Chinese Export; Hollowware; unidentified; body sherd; blue-on-white				8	
1116	1116		Ceramic; porcelain; Chinese Export; Flatware; plate; sherd;;; blue-on-white				2	
1116	1116	800.00	Glass; Personal adornment; bead; flakage;;;;;;;;					
1116	1116	801.00	Glass; Personal adornment; bead; dust;;;;;;;					
1116	1116		Glass; unidentified; bottle; fragment;; clear;;;;;				1	0.60
1116	1116	102.00	Glass; Personal adornment; bead; complete; drawn; simple; black; seed-doughnut; ground; opaque; dull	0.66		1.23	75	
1116	1116	103.00	Glass; Personal adornment; bead; complete; drawn; simple; green; seed-doughnut; ground; trnls; shiny	0.86		1.36	31	
1116	1116	104.00	Glass; Personal adornment; bead; fragment; drawn; simple; red; seed-doughnut; ground; trnls; dull	2.17		2.70	12	
1116	1116	105.00	Glass; Personal adornment; bead; fragment; drawn; compound*; cop/lt blue; seed; ground; opaque; dull	1.55		1.76	16	
1116	1116	107.00	Glass; Personal adornment; bead; fragment; drawn; compound; rd/wh; seed; ground; trnls/o; d/d				19	
1116	1116	110.00	Glass; Personal adornment; bead; fragment; drawn; compound*; tn/lt. blue; seed; ground; o/o; d/d	1.41		1.75	23	
1116	1116	111.00	Glass; Personal adornment; bead; complete; drawn; compound*; tn/lt. blue; seed; ground; o/o; d/d	0.95		1.45	6	
1116	1116	112.00	Glass; Personal adornment; bead; fragment; drawn; simple; wh; seed; ground; opaque; dull	1.37		1.81	6	
1116	1116	113.00	Glass; Personal adornment; bead; fragment; drawn; compound; rd/wh; seed; ground; o/o; d/d	0.91		1.32	202	
1116	1116	116.00	Glass; Personal adornment; bead; complete; drawn; simple; black; seed; ground; opaque; dull	0.72		1.30	174	
1116	1116	114.00	Glass; Personal adornment; bead; fragment; drawn; compound*; tn/lt. blue; seed; ground; o/o; d/d	1.53		1.77	91	
1116	1116		Copper alloy; clasp;; mechanical; unidentified; fragment;;;;;;;;				1	0.14
1116	1116		Ferrous; iron;; Carpentry; nail; proximal fragment				19	53.25
1116	1116		Igneous; basalt;; lithic; possible hammerstone; complete;;;;;;;				1	780.80
1116	1116		Igneous; basalt;; Lithic; debitage; flake;;;;;;;				18	39.36
1116	1116		Brick;; rubble; brick; fragment;;;;;;;				1	3.25
1116	1116		Shell;;; fragment;;;;;;;					249.73
1116	1116		Charcoal;;; fragment;;;;;;;					15.25
1116	1116	115.00	Glass; Personal adornment; bead; fragment; drawn; compound*; tn/lt. blue; seed; ground; o/o; d/d	1.04		1.39	21	
1116	1116	117.00	Glass; Personal adornment; bead; fragment; drawn; compound*; tn/gr; seed; ground; o/trnls; d/s;	1.19		1.36	66	
1116	1116	118.00	Glass; Personal adornment; bead; fragment; drawn; compound; rd/wh; seed; ground; trnls/o; s/d;				200	
1116	1116	106.00	Glass; Personal adornment; bead; complete; drawn; simple; gr; double seed; ground; trnls; shiny;	2.06		1.50	10	
1116	1116	108.00	Glass; Personal adornment; bead; fragment; drawn; simple; black; double seed; ground; opaque; shiny	4.28		1.29	8	
1116	1116	109.00	Glass; Personal adornment; bead; fragment; drawn; compound; rd/yel; double seed; ground; o/o; d/d				4	
1116	1116	119.00	Glass; Personal adornment; bead; fragment; drawn; compound*;tn/gr; double seed; ground; o/trrls; d/s	2.01		1.58	17	
1116	1116		Glass; unidentified; bottle; fragment;;; green;;;;;				1	0.69
1116	1116		Glass; unidentified; unknown; fragment;;; dark green;;;;;				2	8.34

Table B2. (cont.)

CAT#	FLD CAT# ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE NO.	WT.
	1202	Metal; copper/silver?;; Personal adornment; ring;;; simple;;;;;;			20.89 mm		1	
1116	1116	Metal; iron;; Carpentry; coffin nail; fragment;; composite with wood;;;;;					28	
1116	1116	Metal; iron;; Carpentry; coffin nail; complete?; cut; composite with wood;;;;;					2	
1116	1116	Metal; iron;; Carpentry; coffin nail; fragment; cut; composite with wood;;;;;					11	
	1202	Metal; Iron;; Carpentry; coffin nail; fragment;;;;;;;					1	
1116	1116	Metal; iron;; carpentry; nail; fragment;;;;;;;						41.09
184T	1202	Stone; Chert ?;; Lithic; debitage; flake;;; tan;;;;;					1	
1116	1116	Igneous; basalt;; Lithic; debitage; flake;;;;;;;					2	
1116	1116	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			0.5-1 cm		146	
1116	1116	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			1-1.5 cm		55	
1116	1116	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			1.5-2 cm		12	
1116	1116	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			2-2.5 cm		2	
1116	1116	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			2.5-3 cm		2	
1116	1116	Igneous; basalt;; unidentified; manuport; waterworn pebbles;;;;;;;						7,562.50
1116	1116	Igneous; Volcanic glass;; lithic; debitage; fragment;;;;;;;;					1	0.67
1116	1116	Igneous; basalt;; lithic; adze fragment; fragment; polished;;;;;;					1	13.52
1116	1116	Unidentified stone; unidentified;; Unidentified; manuport; waterworn pebble			1.5-2 cm		3	
1116	1116	Unidentified stone; unidentified;; Unidentified; manuport; waterworn pebble			0.5-1 cm		10	
1116	1116	Unidentified stone; unidentified;; Unidentified; manuport; waterworn pebble			1-1.5 cm		9	
181T	1202	Organic; organics;; Unidentified;; fragments;; composite of matter.;;;;;						
181	1202	Organics; organic material;; Unidentified;; fragments;;;;;;;;						

Table B3. Individual I0004, Feature 6, Excavation Units 32 and 88, Date range: Ca. 1825-ca. 1850.

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE NO	O. WT.
118	1118		Ceramic; Porcelain; Off-white paste; Hollowware; cup?; body sherd; overglaze impression					1	
118	1118		Ceramic; Earthenware; Pearlware?; Hollowware;; body sherd; blue on white; hand painted					1	
118	1118		Ceramic; Earthenware; Creamware; Flatware; plate/saucer; rim sherd; scalloped rim?; undecorated					1	
18	1118		Ceramic; Earthenware; Pearlware; Hollowware; cup/mug/pot?; body sherd; blu/brn/wh/beadd; banded					1	
18	1118		Glass; Beverage; case bottle?; fragment;; eren;; eren;;;;;					1	
18	1118		Glass; Unidentified; vessel; fragment;; clear; flake charact.'s?;;;;					1	
118	1118		Glass; Beverage; drinking glass; rim fragment;;; clear;;;;;					1	
18	1118		Glass; Beverage; drinking glass?; base fragment;; clear;;;;;;					1	
18	1118		Iron/copper alloy +; Mammal bone?;; Personal artifact; smoking pipe?					1	
18	1118		Metal; Iron;; Carpentry; nail; fragment;;;;;;;;					4	
118	1118		Metal; Iron;; Carpentry; nail; fragment;;;; -y;;;;					10	
18	1118		Metal; Alloy?;; Carpentry; nail; fragment; cut;;;;;;					2	
118	1118		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;;					6	
18	1118		Metal; Iron;; Carpentry; nail; fragment;;;; -y;;;;					1	
118	1118		Metal; Iron;; Carpentry; nail; fragment;;;; -y;;;;					1	
118	1118		Metal; Iron;; Carpentry; nail; fragment;;;; -y;;;;					1	
118	1118		Metal; Iron;; Carpentry; coffin nail; complete; cut;;; y;;;	3.8				1	
18	1118		Metal; Iron;; Carpentry; nail; complete; cut;;; y;;;	4.6				1	
118	1118		Metal; Iron;; Carpentry; coffin nail; fragment; cut; composite with wood; mineralized wood?					12	
18	1118		Metal; Iron;; Carpentry; nail; fragment; cut;;;;;;					69	
18	1118		Metal; Iron;; Carpentry; coffin nail; fragment; cut; composite with wood; mineralized wood?					10	
18	1118		Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;			17.9		1 1	
18	1118		Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;;			17.8		1 1	
18	1118		Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;;			18.3		1 1	
18	1118		Bone; Mammal bone;; Clothing; button; fragment;; simple;;;;;;			(4 pc.s)		1	
18	1118		Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;;			17.9		1 1	
18	1118		Bone; Mammal bone;; Clothing; button; fragment;; simple;;;;;;			(4 pc.s)		1	
118	1118		Bone; Mammal bone;; Clothing; button; fragment;; simple;;;;; incised?			(2 pc.s)		5 1	
18	1118		Bone; Mammal bone;; Clothing; button; fragment;; simple;;;;; incised?			16.5		5 1	
18	1118		Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;;			17.7		1 1	
18	1118		Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;;			18.2		1 1	
18	1118		Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;;			18.4		1 1	
18	1118		Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;			18.4		1 1	
118	1118		Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;;			17.9		1 1	
18	1118		Wood; Charcoal;; Thermal product;; fragments;;;;;;;						
18	1118		Wood; Charcoal;; Thermal product;; fragments;;;;;;;						

Table B3. (cont.)

CAT#	FLD CAT# ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO.	WT.
118	1118	Igneous; basalt, vesicular;; Unidentified; manuport; waterworn pebble			4.5-5 cm	1	
118	1118	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			2.5-3 cm	3	
118	1118	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			2-2.5 cm	2	
118	1118	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			1.5-2 cm	1	
118	1118	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			1-1.5 cm	4	
118	1118	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			0.5-1 cm	1	
118	1118	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			2.5-3 cm	2	
118	1118	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			1.5-2 cm	1	
118	1118	Igneous; basalt;; Lithic; debitage; flake;;;;;;;				6	
118	1118	Igneous; basalt;; Lithic; debitage; flake;;;; polished surface;;				1	
118	1118	Igneous; basalt;; Lithic; debitage; angular waste;;;;;;;				4	
118	1118	Igneous; basalt;; Lithic; debitage; flake;;;;;;;				1	
118	1118	Brick; brick;; Structure; brick; fragment;;;;;;;				1	
118	1118	Paper; paper;; Printing; page/sheet; fragment;;;; airm; gge;;;				1	

Table B4. Individual I0009, Feature 5, Excavation Units 32, 88-89, & 100, Date range: ca. 1830-ca. 1950.

CAT#	FLD CAT# AF	T# DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO.	WT.
31T	1203	Glass; Unidentified; bottle; body fragment; ABM; scalloped surface; clear; horizontal seam				1	
31T	1203	Glass; Beverage; whiskey bottle?; body fragment; ABM;; clear;;; vertical seam				1	
31	1203	Metal; iron;; Carpentry; nail; fragment;;;;;;;				15	
1128	1128	Metal; copper alloy;; Carpentry; coffin nail; fragment; cut;;;;;;;				1	
1128	1128	Metal; iron;; Carpentry; nail; fragment;;;;;;;				2	
1128	1128	Metal; iron;; Carpentry; nail; fragment; cut;;; y;;;				1	
31	1203	*Metal; Aluminum foil;; Beverage; beer, neck wrapping; fragment					
107T	1203	Metal; Copper alloy;; Carpentry; coffin nail; fragment; cut; composite with wood;				1	
106T	1203	Metal; Iron;; Carpentry; coffin nail; fragment;;;;;;;				1	
31T	1203	Metal; Iron;; Carpentry; nail; complete;;; y;;; y;	6.7			1	
31T	1203	Metal; Iron;; Carpentry; nail; fragment;;; y;;; y;				1	
1128	1128	Igneous; basalt;; Lithic; debitage; flake;;;;;;;				5	
1128	1128	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			1-1.5 cm	6	
1128	1128	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			0.5-1 cm	4	
1128	1128	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			1.5-2 cm	1	
1128	1128	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			2-2.5 cm	1	
1128	1128	Unidentified stone; unidentified;; Unidentified; manuport; waterworn pebble			0.5-1 cm	3	

^{*}Aluminum foil from beer bottle is an intrusion probably from the ca. 1950 construction; without it date range ends ca. 1850.

Table B5. Individual I0010, Feature 7, Excavation Units 1, 32,33, 37,38, Date range: ca. 1850-ca. 1860.

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO. WT.
130	1130	26.00	Glass; Personal adornment; bead; complete; wound; compound*; burnt or/amber; spherical; ground; o/translus; s/d	10.35		12.09	1
130	1130	64.00	Glass; Personal adornment; bead; complete; wound; simple; lt. olive gr; spherical; ground; trnls; dull	10.42		11.64	1
130	1130	65.00	Glass; Personal adornment; bead; complete; wound; compound*; br/lt. olive gr; spherical; ground; - o/trnls; d/d	11.16		13.56	1
30	1130	66.00	Glass; Personal adornment; bead; complete; wound; compound*; cop/turq; round; ground; o/o; s/d	5.75		7.54	1
30	1130	67.00	Glass; Personal adornment; bead; complete; wound; compound*; cop/turq; round; ground; o/o; s/d	7.32		7.11	1
30	1130	68.00	Glass; Personal adornment; bead; complete; wound; compound*; wh/bl; round globula; ground; o/tnls; d/s	5.43		6.48	1
30	1130	69.00	Glass; Personal adornment; bead; complete; wound; compound*; wh/bl; round globula; ground; o/trnls; d/s	4.61		6.67	1
30	1130	70.00	Glass; Personal adornment; bead; complete; wound; compound*; wh/yel; ellipsoid; ground; o/o; s/s	9.85		7.33	1
30	1130	71.00	Glass; Personal adornment; bead; complete; wound; compound*; wh/yel; ellipsoid; ground; o/o; s/s	9.23		6.78	1
30	1130	72.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny;	10.20		10.97	1
30	1130	73.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	10.05		10.73	1
30	1130	74.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	8.85		11.36	1
30	1130	75.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	10.37		11.83	1
30	1130	76.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	10.41		12.14	1
30	1130	77.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	11.85		12.30	1
30	1130	78.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	11.06		11.27	1
30	1130	79.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	9.69		10.51	1
30	1130	80.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	11.00		12.00	1
30	1130	81.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	11.63		13.12	1
30	1130	82.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	10.31		10.73	1
30	1130	83.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	10.78		10.57	1
30	1130	84.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	11.59		12.69	1
30	1130	85.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	9.49		11.14	1
30	1130	86.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	12.38		12.20	1
30	1130	87.00	Glass; Personal adornment; bead; complete; wound; simple; wh; spherical; ground; opaque; shiny	13.33		13.35	1
30	1130	88.00	Glass; Personal adornment; bead; complete; wound; compound; wh/or-pk; convex-elong; ground; o/o; s/d	13.87		7.45	1
30	1130	89.00	Glass; Personal adornment; bead; complete; wound; compound; wh/yel-pk; convex-elong; ground; o/o; s/d	13.54		7.20	1
30	1130	90.00	Glass; Personal adornment; bead; complete; wound; compound; wh/yel-pk; convex-elong; ground; o/o; s/d	13.67		7.57	1
130	1130	91.00	Glass; Personal adornment; bead; complete; wound; compound; wh/or-pk; convex-elong; ground; o/o; s/d	13.53		7.77	1
130	1130	92.00	Glass; Personal adornment; bead; complete; wound; compound; wh/or-pk; convex-elong; ground; o/o; s/d	13.55		7.23	1
130	1130	93.00	Glass; Personal adornment; bead; fragment; wound; compound; wh/yel-pk; convex-elong; ground; o/o; s/d	9.73		7.02	1

Table B5. (cont.)

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH WIDTH	DIAM	THK BORE NO. WT.
130	1130	97.00	Glass; personal adornment; bead; complete; drawn; compound; clear/wh; facet barrel; faceted; trnls/o; d/d	6.87	7.78	1
130	1130	98.00	Glass; personal adornment; bead; complete; drawn; compound; clear/wh; facet barrel; faceted; trnls/o; d/d	6.40	7.47	1
30	1130	99.00	Glass; Personal adornment; bead; complete; drawn; compound; clear/wh; facet barrel; faceted; trnls/o: d/d	6.98	7.57	1
30	1130	100.00	Glass; Personal adornment; bead; complete; drawn; compound; clear/wh; facet barrel; faceted; trnls/o: d/d	6.83	7.89	1
130	1130	101.00	Glass; Personal adornment; bead; complete; wound; simple; white/wh; spherical; ground; opaque; shiny	10.74	13.19	1
130	1130	24.00	Glass; Personal adornment; bead; complete; wound; compound*; burnt or/amber; spherical; ground; o/trnls; s/d	10.01	11.43	1
130	1130	25.00	Glass; Personal adornment; bead; complete; wound; compound*; burnt or/amber; spherical; ground; o/trnls; s/d	11.08	12.69	1
130	1130	22.00	Glass; Personal adornment; bead; complete; wound; compound*; burnt or/amber; spherical; ground; o/trnls; s/d	11.57	12.63	1
130	1130	23.00	Glass; Personal adornment; bead; complete; wound; compound*; burnt or/amber; spherical; ground; o/translus: s/d	10.15	11.87	1
130	1130	21.00	Glass; Personal adornment; bead; fragment; wound; simple; yellow; ellipsoid; ground; opaque; shiny	9.30	6.79	1
130	1130	20.00	Glass; Personal adornment; bead; fragment; W/W; compound; tn/pk/rd/l.pk/w; spherical; ground; o/o/translus; d/s/d;	12.05	11.83	1
130	1130	19.00	Glass; Personal adornment; bead; complete; wound; compound*; copper/turq; spherical; ground; opaque; dull/dull;	5.77	7.18	1
130	1130	17.00	Glass; Personal adornment; bead; complete; wound; compound*; copper/turq; spherical; ground; - opaque; dull/dull	9.71	11.62	1
130	1130	18.00	Glass; Personal adornment; bead; complete; wound; compound*; copper/turq; spherical; ground; opaque; dull/dull	5.98	7.17	1
130	1130	16.00	Glass; Personal adornment; bead; complete; wound; compound*; copper/turq; spherical; ground; opaque; dull/dull	9.30	12.07	1
130	1130	15.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	12.32	13.00	1
130	1130	14.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	10.85	12.70	1
30	1130	13.00	Glass; Personal adornment; bead; complete; wound; simple; White; spherical; ground; opaque; shiny	10.19	13.02	1
30	1130	12.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	12.31	13.13	1
30	1130	11.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	10.27	12.46	1
30	1130	10.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	10.63	12.63	1
30	1130	9.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	10.60	12.60	1
30	1130	8.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	10.38	12.33	1
130	1130	7.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	12.21	13.35	1
130	1130	6.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	10.59	12.54	1
130	1130	5.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	10.03	12.36	1

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO. WT.
1130	1130	3.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	11.00		12.06	1
130	1130	4.00		11.83		12.53	1
130	1130	62.00		9.28		6.74	1
130	1130	2.00	Glass; Personal adornment; bead; complete; wound; simple; white; spherical; ground; opaque; shiny	10.36		11.13	1
130	1130	63.00		11.74		8.03	1
130	1130	61.00		9.77		7.06	1
30	1130	60.00	Glass; Personal adornment; bead; complete; wound; compound; tn/pk-yel; convex; ground; o/o; s/d-	14.58		7.68	1
30	1130	59.00		13.27		7.72	1
30	1130	58.00		13.43		7.69	1
130	1130	57.00	d/d	13.69		7.99	1
30	1130	56.00		13.33		7.42	1
130	1130	55.00		12.39		7.33	1
130	1130	54.00	ground; o/o; s/s	12.20		7.10	1
30	1130	53.00	Glass; Personal adornment; bead; complete; wound; compound; pearl white/pk; convex; ground; o/o; s/s			10.04	1
30	1130	52.00	Glass; Personal adornment; bead; complete; wound; compound; pearl white/pk; convex; ground; o/o; s/s			9.48	1
130	1130	51.00	Glass; Personal adornment; bead; complete; wound; compound; pink stripe/wh; cnvx w/striat; ground; opaque; shiny; stripes	16.40		9.63	1
30	1130	50.00	Glass; Personal adornment; bead; complete; wound; compound; pearl-wh/yellow; convex; ground; o/o; s/d	10.12		7.33	1
30	1130	49.00	Glass; Personal adornment; bead; complete; wound; compound; or-pk/wh; spherical; ground; o/o; s/d	9.82		9.57	1
30	1130	48.00	Glass; Personal adornment; bead; complete; wound; simple; tan/white; spherical; ground; o/o; d/s	9.33		10.72	1
30	1130	47.00	Glass; Personal adornment; bead; complete; wound; compound; Silver/Blue; convex; ground; o/trnls; s/d	13.26		8.32	1
30	1130		Metal; iron;; Carpentry; coffin nail; fragment; cut;;;; y;;				10
30	1130		Metal; iron;; Carpentry; nail; fragment;;;;;;;				13
30	1130		Metal; iron;; Carpentry; nail; fragment;;;; y;;	3.3			2
30	1130		Metal; iron;; Carpentry; coffin nail; complete; cut;;;; y;;	3.3			3
30	1130		Metal; iron;; Carpentry; coffin nail; fragment;;;;; y;;	2.8			6
30	1130		Metal; iron;; Carpentry; nail; fragment;;;;;;;				15
30	1130		Metal; iron;; Carpentry; coffin nail; complete; cut;;;; y;;	6.5			5
30	1130		Metal; iron;; Carpentry; coffin nail; complete; cut?;;; y;;	2.8			10
30	1130		Metal; iron;; Carpentry; tack; complete;;;;;;;	1.4			1
	1209		Metal; Iron;; Carpentry; coffin nail; fragment;;;; y;;;				1
30	1130		Igneous; basalt;; Lithic; debitage; flake;;;;;;;				1
30	1130		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			1.5-2 cm	1
30	1130		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			1-1.5 cm	2
30	1130		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			0.5-1 cm	8
30	1130		Unidentified stone; unidentified;; Unidentified; manuport; waterworn pebble			0.5-1 cm	2

Table B6. Individual I0011, Feature 9, Excavation Units 34-35-36, Date range: ca. 1820-ca. 1850.

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE	NO.	WT.
	1205	802.00	Metal; copper alloy;; Clothing; straight pin; pin;;;;;;;	4.00		0.1 cm			1	
130T	1205		Metal; Iron;; Carpentry; nail; fragment;;; y;;;;					2		
131T	1205	9	Wood; Charcoal;; Thermal product;; fragment;;;;;;;							

Table B7. Individual I0012, Feature 9a, Excavation Units 36, Date range: ca. 1830-ca. 1850.

CAT#	FLD CAT# ART	# DESCRIPTION	LENGTH W	IDTH DIAM	THK BORE NO. WT.
119T	1206	Metal; iron;; Carpentry; nail; fragment;;;;;;			10
128T	1206	Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			5
129T	1206	Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			4
129T	1206	Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;; y;;	3.3		4
125T	1206	Metal; Iron;; Carpentry; nail; complete;;; y;;;;	2.4		2
127T	1206	Metal; Iron;; Carpentry; nail; complete;; composite with wood;;; y;;	3.4		1
124T	1206	Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			10
127T	1206	Metal; Iron;; Carpentry; nail; complete;; composite with wood;;; y;;	2.9		2
127T	1206	Metal; Iron;; Carpentry; nail; complete;; composite with wood;;; y;;	2.7		4
127T	1206	Metal; Iron;; Carpentry; nail; complete;; composite with wood;;; y;;	4.1		1
122T	1206	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;; -		1-1.5 cm	2
122T	1206	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;		0.5-1 cm	4
122T	1206	Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble		1-1,5 cm	1
122T	1206	Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble		0.5-1 cm	2

Table B8. Individual I0016, Feature 10, Excavation Units 34, 36-37, Date range: ca. 1825-ca. 1850.

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO. WT.
		711(1#		ELINGTII	WIDIII	DIMINI	THE BORE NO. WI.
134	1134		Ceramic; Stoneware; Gray paste; Hollowware; sherd; brown;; outer glaze missing; saltglaze				1
134	1134		Ceramic; Porcelain; Green-gray paste; Unidentified; body sherd; blue; underglaze; painted; swirl				1
134	1134		Glass; Beverage; drinking glass; lip fragment;;; clear;;;;				3
134	1134		Glass; Unidentified;; fragment;; green with patina;;;;				2
134	1134		Metal; Lead;; Unidentified;; fragment;;; flat;;; fair;				2
134	1134		Metal; iron;; Structure; spike, possible; fragment;;;;; poor;				6
134	1134		Metal; iron;; Structure; spike, large; fragment;;; square;;; poor;				1
134	1134		Metal; iron;; Structure; spike, large; spike;;;;; fair;	10.4			1
1T	1204		Metal; Iron;; Carpentry; nail; fragment;;; y;;;				4
134	1134		Metal; Iron;; Carpentry; nail; fragment; cut;;; y;;;				1
3T	1204		Metal; Iron;; Carpentry; nail; fragment; cut;;; y;;;				5
5T	1204		Metal; Iron;; Carpentry; nail; fragment; cut;;; y;;;				2
2T	1204		Metal; Iron;; Carpentry; nail; complete;;; y;;;	7.9			1
2T	1204		Metal; Iron;; Carpentry; nail; complete;;; y;;; y;;	7.6			1
2T	1204		Metal; Iron;; Carpentry; nail; complete;;; y;;; y;;	7.8			1
2T	1204		Metal; Iron;; Carpentry; nail; complete;;; y;;;;	7.4			1
	1204		Metal; Iron;; Carpentry; nail; fragment;;; y;;; y;				4
5T	1204		Metal; Iron;; Carpentry; nail; fragment; cut;;;;;;				1
2,82T	1204		Metal; Iron;; Carpentry; nail; fragment; cut;;;;;;				2
134	1134		Metal; Iron;; Carpentry; nail; fragment; cut;;; y;;;				6
134	1134		Metal; Iron;; Carpentry; nail; fragment; cut;;;;;;;				21
134	1134		Metal; Iron;; Carpentry; nail; complete;;; y;;;;				1
134	1134		Metal; Iron;; Carpentry; nail; complete;; composite with wood;;; y;;;				1
	1204		Metal; Iron;; Carpentry; nail; fragment; cut;;;;;;				26
134	1134		Wood; Charcoal;; Thermal product;; fragments;;;;;;;				1
134	1134		Wood; Charcoal;; Thermal product;; fragments;;;;;;;				
	1204		Wood; Wood;; Carpentry; coffin; small fragments;;;;;;;				
134	1134		Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			3-3.5 cm	
134	1134		Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			2.5-3 cm	
34	1134		Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			1.5-2 cm	
34	1134		Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			1-1.5 cm	
34	1134		Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			0.5-1 cm	
34	1134		Unidentified stone; unidentified; unknown; Unidentified; manuport; fragment				3
34	1134		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			3-3.5 cm	
34	1134		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			2.5-3 cm	
134	1134		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			2-2.5 cm	
134	1134		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			1.5-2 cm	
134	1134		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			1-1.5 cm	8
134	1134		Igneous; basalt;; Lithic; debitage; flake;;;;;;;				4
34	1134		Marine fauna; coral;; Unidentified;; fragment;;;;;;;				6

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Table B9. Individual I0016/17, Feature 10, Excavation Units 36, Date range: ca. 1825-ca. 1850.

CAT#	FLD CAT# ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO.	WT.
CITI	CZTT# ZHCT#	BESCHI HON	EEROIII	11111111	Diriiii	THE BOILE NO.	*** 1.
1139	1139	Glass; Beverage; bottle; fragment;;; brown;;;;;				1	
1139	1139	Metal; iron;; Machinery?;; fragment;;;;;;;				9	
1139	1139	Wood; Charcoal;; Thermal product;; fragments;;;;;;;					
1139	1139	Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			1-1.5 cm	1	
1139	1139	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			1.5-2 cm	2	
1139	1139	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			0.5-1 cm	1	
1139	1139	Igneous; basalt;; Lithic; debitage; flake;;;;;;;				2	
1139	1139	Igneous; basalt;; Lithic; debitage; angular waste;;;;;;;;				3	
1139	1139	Marine fauna; coral;; Unidentified;; fragments;;;;;;;;				5	
1139	1139	Mineral; crystalline mineral;; Unidentified;; fragment;;;;;;;			n/a	4	
1138	1138	Sediment; unknown;; Unidentified;; sediment;; red;; red;;;;					
1138	1138	Unidentified; Red material;; Unidentified;; sediment;; RED;;;;;					

Table B10. Individual I0017, Feature 10, Excavation Unit 36, Date range: ca. 1825-ca. 1850.

CAT#	FLD CAT# ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE NO.	WT.
1139	1139	Metal; Iron;; Carpentry; nail; fragment;;;;;;;					1	
1139	1139	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			0.5-1 cm		2	
1139	1139	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			1-1.5 cm		3	
1139	1139	Marine fauna; coral;; Unidentified; manuport?; fragments;;;;;;;					5	

Individuals from Block II

Table B11. Individual I0005, Feature 213, Excavation Units 84 & 106, Date range: ca. 1810-ca. 1850.

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE 1	NO.	WT.
2291	2291		Ceramic; Porcelain;; Clothing; button; complete;; simple; White;;; Opaque;			11.5		4 1		
2290	2290		Ceramic; Earthenware; Yellowware; Hollowware;; body sherd; banded;; mocha					1		
2291	2291		Ceramic; Earthenware; Pearlware; Hollowware;; foot ring sherd; undecorated;;					1		
2291	2291		Ceramic; Earthenware; Pearlware; Flatware?; platter/serving; rim sherd; rectangular; undecorated					1		
2291	2291		Ceramic; Porcelain; English soft paste; Hollowware;; body sherd;;; underglaze, blue					1		
2293	2293		Glass; Unidentified;; fragment;; brown;;;;					2	2	
2293	2293		Glass; Unidentified;; fragment;;; green;;;;;					1		
2291	2291		Glass; Structure; window pane?; fragment;;; clear;;;;;					1		
2291	2291		Glass; Beverage; wine bottle; base fragment;;; dark green;;;;					3	3	
2291	2291		Glass; Unidentified;; body fragment;;; light green;;;;					1		
2291	2291		Glass; Beverage?; bottle?; body fragment;; green; 1pc.OS;2 pc.emboss; red/white label frag					5	5	
2291	2291		Glass; Beverage; beer bottle?; base fragment;; eren;; eren;;;;;					1		
2291	2291		Metal; copper alloy;; Cutlery, kitchen; carving knife; handle rivet;;;;; fair					1		
2291	2291		Metal; Iron;; Carpentry; nail; fragment;;;;;;;					2	2	
2291	2291		Metal; Iron;; Carpentry; wire/nail?; fragment;;;;;;;					1		
2291	2291		Metal; Iron;; Carpentry; nail; fragment;;;;;;;					1		
2291	2291		Metal; Iron;; Carpentry; nail; fragment; cut;;; y;;;					1		
2294	2294		Metal; Iron;; Carpentry; nail; fragment;;;;;;;					1		
2293	2293		Metal; Iron;; Carpentry; nail; fragment;;;;;;;					1		
2293	2293		Metal; Iron;; Carpentry; nail; fragment;;; y;;;;					1		
5T	2401		Metal; Alloy;; Carpentry; nail; complete; cut;;; y;;;	5.2				1		
7T	2401		Metal; Alloy;; Carpentry; nail; complete; cut;;; y;;;	5.6				1		
2291	2291		Metal; Iron;; Carpentry; nail; fragment; cut;;;;;;					1		
182T	2401		Metal; Iron;; Carpentry; nail; fragment;;; y;;;					2	2	
182T	2401		Metal; Iron;; Carpentry; nail; fragment;;; y;;;					2	2	
9T	2401		Metal; Iron;; Carpentry; nail; fragment;;; y;; y;;					1		
2290	2290		Metal; Iron;; Carpentry; nail; fragment;;;;;;;;					5	5	
2290	2290		Metal; Iron;; Carpentry; nail; fragment;;; v;; v;;					2	2	
2290	2290		Metal; Iron;; Carpentry; nail; fragment;;;; y;;;					1		
2290	2290		Metal; Iron;; Carpentry; nail; fragment;;;; v;;;					1		
2290	2290		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;; y;;					1		
6T	2401		Metal; Iron;; Carpentry; coffin nail; fragment; cut;; Type 9*; y;;; >1820					1		
8T	2401		Metal; Iron;; Carpentry; nail; fragment;;;; y;;;;					1		

Table B11. (cont.)

	FLD								
CAT#	CAT# AR	T# DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE	NO.	WT.
2291	2291	Metal & wood; cop.alloy/iron/wood; Cutlery, kitchen; carving knife; handle rivet w/plate; composite; fair		2.50				1	
2291	2291	Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;			11.9		1	1	
179T	2401	Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;			11.8		1	1	
3T	2401	Stone; slate;; Structure;; fragment;;;;;;;; -						1	
2293	2293	Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			1-1.5 cm			3	
2293	2293	Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			1.5-2 cm			1	
293	2293	Wood; Charcoal;; Thermal product;; fragments;;;;;;;							
293	2293	Igneous; volcanic glass;; Lithic; debitage; shatter;;;;;;;						1	
2293	2293	Brick; brick;; Structure; rubble; fragments;;;;;;;;							
290	2290	Masonry; Brick;; Structure; brick; fragment;;;;;;;						1	
293	2293	Mineral; graphite;; Writing; pencil lead?; fragment;;;;;;;;						1	
293	2293	Coal; coal;; Thermal product;; fragments;;;;;;;							56.00
ΙT	2401	Fiber; wool?;; Textile; cloth; fragment;; large weave; gray;;;;;	7.1 cm	3.80		0.30		1	

Table B12. Individual I0006, Feature 204, Excavation Units 44-45, & 109, Date range: ca. 1810-ca. 1950.

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO. W
2282	2282		Ceramic; Porcelain/Milk glass;; Clothing; button; complete;; simple; White; Opaque;			11.3	4
2280	2280		Ceramic; Stoneware;; Unidentified;; sherd;; brown;; salt overglaze;;				2
280	2280		Ceramic; Earthenware; Pearlware; flatware; saucer; fragment;; blue/white; Chinese export decor				2
278	2278		Ceramic; Earthenware; Whiteware; Unidentified;; body sherd;; blue; printed				1
280	2280		Glass; Beverage; case bottle?; fragment;;; Clear;;;;;				4
280	2280		Glass; Structure; window pane?; fragment;;; Clear;;;;;				1
280	2280		Glass; Unidentified; vessel; fragment;; pale aqua;;;;;				1
280	2280		Glass; Unidentified; vessel; fragment;;; green;;;;;				1
280	2280		Glass; Unidentified; vessel; fragment;;; Clear;;;;				2
280	2280		Glass; Unidentified;; fragment;;; clear;;;;;				3
280	2280		Glass; Unidentified;; fragment;;; clear;;;;;				1
280	2280		Glass; Personal adornment; bead; fragment; wound; compound; white/red/white; ground; o/t/o; s/s/s				1
278	2278		Glass; Unidentified;; fragment;;; clear;;;;;				4
278	2278		Glass; Unidentified;; fragment;;; green;;;;;				7
282	2282	43.00	Glass; Personal adornment; bead; complete; wound compound*; tan/red; spherical; ground;o/trnls; d/d;	8.18		9.31	1
282	2282	44.00	Glass; Personal adornment; bead; complete; wound; compound; tn/pk/rd/wh; spherical; ground;	115		11.31	1
282	2282	45.00	o/o/trnls/o; s/d/d/d; Glass; Personal adornment; bead; fragment; wound; simple; yellow; spherical; ground; opaque; dull	14.68		16.69	1
	2414		Glass; slag;; Thermal product;; fragment;;;;;;;				1
	2414		Glass; Unidentified;; fragment;; clear;;;;;				1
	2414		Glass; Unidentified;; fragment;; green;;;;;				1
	2414		Glass; Unidentified;; fragment;;;;;;;				
278	2278		Metal; iron;; Unidentified; unknown; fragment;;;;; poor;				2
	2414		Metal; iron;; Structure; hinge?; part;;;;;;;; -				1
280	2280		Metal; iron;; Carpentry; coffin nail; fragment; Cut; composite with wood;;; y;;				1
280	2280		Metal; iron;; Carpentry; nail; fragment; Cut; composite with wood;;;;;				1
280	2280		Metal; iron;; Carpentry; nail; fragment; wire;;;;;;				3
	2414		Metal; copper alloy;; Clothing?; hook & fastener; hook & fastener				
278	2278		Metal; iron;; Carpentry; nail; fragment; cut;;;;;;;				1
256	2256		Metal; Iron;; Carpentry; nail; complete; cut;;; v;;;	6.1			1
256	2256		Metal; Iron;; Carpentry; nail; fragment; cut;;;;;;;				1
80	2280		Metal; iron;; Unidentified;; fragment;;; flat;;;				5
80	2280	808.00	Slag; slag;; Thermal product; iron working; fragment;;;;;;;;				1
80	2280		Slag; slag;; Thermal product; iron working; fragment;;;;;;;;				1
80	2280		Bone; Mammal bone; Enamel/ivory?; Unidentified;; fragment				1
282	2282	46.00	Bone; Mammal bone; Personal adornment; bead; fragment; simple; bone; ellipsoid; ground	43.34		12.72	1
280	2280		Wood; Charcoal; Thermal product;; fragment;;;;;;;				2
282	2282		Wood; wood;; Carpentry; coffin?; fragment;;;;;;;				3
	2414		Wood; wood;; Carpentry; coffin?; sample;;;;;;;;				

Table B12. (cont.)

CAT#	FLD CAT# ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE NO.	WT.
2280	2280	Unidentified stone; unidentified; unidentified; Unidentified; manuport; waterworn pebble					3	
2278	2278	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			0.5-1 cm		1	
2278	2278	Igneous; basalt or slate;; Lithic; debitage; angular waste;;;;;;;					1	
2280	2280	Igneous; volcanic glass;; Lithic; tool?; debitage;;;;;;;					1	
	2414	Igneous; basalt;; Lithic; debitage; angular waste;;;;;;;					1	
2280	2280	Masonry; brick;; Structure; brick; fragment;; red;;;;;					11	
2278	2278	Brick; brick;; Structure; rubble; fragments;;;;;;;						
	2414	Marine fauna; shell;; Unidentified; manuport; fragment;;;;;;;					1	
2280	2280	Coal; coal;; Thermal product;; fragment;;;;;;;					12	
2278	2278	Coal;;; Thermal product;; fragments;;;;;;;					2	3.39
2278	2278	Coal; coal;; Thermal product;; fragments;;;;;;;					13	

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE NO.	WT.
		ИИТ		LENGIII	WIDIII	DIMIN	TITIK	DOKE NO.	** 1.
2298	2298		Ceramic; Porcelain; Off-white paste; Unidentified;; sherd;;;; undecorated					1	
2299	2299		Glass; Unidentified;; fragment;;; white milk glass;;;;					1	
2299	2299		Glass; Unidentified;; fragment;;; brown;;;;;					2	
299	2299		Glass; Unidentified;; fragment;;; green;;;;;					2	
299	2299		Glass; Unidentified;; fragment;;; light green;;;;;					3	
298	2298		Glass; Unidentified;; fragment;;; light green;;;;;					4	
298	2298		Glass; Unidentified;; fragment;; green;;;;;					2	
298	2298		Glass; Unidentified;; fragment;;; brown;;;;					2	
298	2298		Glass; Unidentified;; fragment;; clear;;;;;					2	
298	2298		Glass; Unidentified;; fragment;;; light green;;;;;					1	
298	2298		Glass; Unidentified;; fragment;;; dark green;;;;;					2	
299	2299		Glass; Unidentified;; fragment;; clear;;;;;					1	
298	2298		Metal; ferrous;; Machinery?;; knob;;; hexagonal;;; fair;					1	
298	2298		Metal; iron;; Unidentified;; fragment;;;;; poor;					24	
298	2298		Metal; iron;; Unidentified;; fragment;;; flat;;; poor;					1	
298	2298		Metal; Iron;; Carpentry; nail; fragment;;;;;;;					6	
300	2300		Metal; Iron;; Carpentry; nail; fragment; cut;;; y;;;					1	
300	2300		Metal; Iron;; Carpentry; nail; fragment; cut;;;;;;;					1	
300	2300		Metal; Iron;; Carpentry; nail; fragment; cut;;; y;;;					1	
300	2300		Metal; Iron;; Structure; spike; fragment; cut;;;;;;;					1	
299	2299		Wood; Charcoal;; Thermal product;; fragments;;;;;;;						
299	2299		Stone; slate?;; Structure?;; angular waste;;;;;;;					4	
299	2299		Stone; slate?;; Structure?;; angular waste;;;;;;;					1	
298	2298		Stone; slate?;; Structure?;; angular waste;;;;;;;					20	
298	2298		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;;			0.5-1 cm		1	
299	2299		Igneous; basalt;; Lithic; debitage; angular waste;;;;;;;;					4	
298	2298		Brick; brick;; Structure; rubble; fragments;;;;;;;;						
299	2299		Brick; brick;; Structure; rubble; fragments;;;;;;;						
298	2298		Brick; brick;; Structure; rubble; fragment;;;;;;;						
298	2298		Concrete/stone;; Structure; rubble; fragments;; grey paint;;;;;					1	
298	2298		Marine fauna; coral;; Unidentified;; aggregates;;;;;;;;					1	
298	2298		Coal; coal;; Thermal product;; fragments;;;;;;;					-	
299	2299		Coal; coal;; Thermal product;; fragments;;;;;;;						163.
292	2292		Coal;; Thermal product;; fragments;;;;;;					4	105.
298	2298		Coal; coal;; Thermal product;; fragments;;;;;;;					•	
300	2300		Coal; coal;; Thermal product;; fragment;;;;;;;					1	
299	2299		Coal/aggregate;; Thermal product;; fragment;;;;;;;; -					1	

Table B14. Individual I0008, Feature 215, Excavation Units 44-45, & 52, Date range: ca. 1810-ca. 1850.

CAT#	FLD CAT# ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE NO.	WT.
2296	2296	Metal; copper alloy;; Personal adornment; chain; fragment/sediment;;; green stain					1	
118T	2402	Metal; copper alloy;; Personal religious; crucifix; crucifix w/chain					1	
183T	2402	Metal; Iron;; Carpentry; nail; fragment					1	

Table B15. Individual I0013, Feature 214, Excavation Unit 50, Date range: ca. 1825-ca. 1850.

CAT#	FLD CAT# ART	# DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE N	IO. WT.
2309	2309	Glass; Unidentified;; fragment;;; clear;;;;;				6	
311	2311	Glass; Unidentified;; fragment;;; clear;;;;;				1	
309	2309	Glass; Unidentified;; fragment;;; frosted clear;;;;;		-		1	
309	2309	Glass; Unidentified;; fragment;; pale green;;;;;		-		2	
80T	2403	Metal; Iron;; Carpentry; nail?; fragment;;;;;;;		-		2	
6T	2403	Metal; Iron;; Carpentry; coffin nail; fragment;; composite with wood;;; y;;		-		1	
5T	2403	Metal; Iron;; Carpentry; nail; fragment;;;;;;;		-		1	
309	2309	Metal; Alloy;; Carpentry; nail; fragment;;;;;;;		-		1	
311	2311	Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;		-		5	
311	2311	Metal; Iron;; Carpentry; nail; fragment; cut;;;;;;		-		1	
	2403	Metal; Iron;; Carpentry; nail; complete;;; y;;;		-			
312	2312	Metal; Iron;; Carpentry; nail; fragment;;;; y;;;		-		1	
312	2312	Metal; Iron;; Carpentry; nail; fragment;;;; y;;;		-		1	
312	2312	Metal; Iron;; Carpentry; nail; fragment;;;;;;;		-		2	
312	2312	Metal; Iron;; Carpentry; nail; fragment;;;;;;;		-		1	
7T	2403	Metal; Iron;; Carpentry; coffin nail; fragment;; composite with wood;;;;;		-		2	
	2403	Metal; Iron;; Carpentry; nail; fragment;;;;;;;		-		1	
	2403	Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;		-		6	
	2403	Metal; Iron;; Carpentry; nail; fragment;;;; y;;;		-		5	
	2403	Metal; Iron;; Carpentry; nail; complete;;;; y;;;	6.2	-		1	
80T	2403	Metal; Iron;; Carpentry; nail?; fragment;;;;;;;		-		2	
80T	2403	Metal; Iron;; Carpentry; nail?; fragment;;;;;;;		-		4	
215	2215	Metal & wood; wood and metal;; Carpentry; coffin nail?; fragment;; composite with wood; y		-		1	
80T	2403	Metal & wood; wood w/metal residue;; Carpentry; coffin; sample;;;;;;;;		-			
30T	2403	Metal & wood; wood and metal;; Carpentry; coffin nail?; fragment;; composite with wood;		-			
80T	2403	Metal & wood; wood and metal;; Carpentry; coffin nail?; fragment;; composite with wood					
78T	2403	Bone; mammal bone;; Clothing; button; complete;; simple;;;;;;			18.3	1	
78T	2403	Bone; Mammal bone;; Clothing; button; complete;; simple;;;;;			18.1	1	
78T	2403	Bone; Mammal bone;; Clothing; button; fragment;; simple;;;;;;				1	
78T	2403	Bone; Mammal bone;; Clothing; button; fragment;; simple;;;;;;			17.9	1	
316	2316	Wood; Wood;; Carpentry; coffin?; small fragments;;;;;;;;					
309	2309	Wood; Wood;; Carpentry; coffin?; small fragments;;;;;;;;		-			
Τ	2403	Wood; Wood;; Carpentry; coffin?; small fragments;;;;;;;;					
11	2311	Wood; Wood;; Carpentry; coffin?; small fragments;;;;;;;;		-			
316	2316	Wood; Charcoal;; Thermal product;; fragments;;;;;;;					
T	2403	Wood; Charcoal;; Thermal product;; fragments;;;;;;;					
30T	2403	Wood; sediment;; Carpentry; coffin; sample;;;;;;;		-			
30T	2403	Wood; wood;; Carpentry; coffin; fragment;;;;;;;		-			
T	2403	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			1-1.5 cm	1	
2T	2403	Igneous; basalt;; Lithic; debitage; flake;;;;;;;				1	

Table B15. (cont.)

-	FLD				
CAT#	CAT# ART#	DESCRIPTION	LENGTH WIDTH	DIAM THK	BORE NO. WT.
2309	2309	Igneous; basalt;; Lithic; debitage; flake;;;;;;;			1
2316	2316	Igneous; basalt;; Lithic; debitage; angular waste;;;;;;;			2
2311	2311	Igneous; basalt;; Lithic; debitage; angular waste;;;;;;;			4
2316	2316	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			
2316	2316	Igneous; volcanic glass;; Lithic; debitage; shatter;;;;;;;			1
177T	2403	Igneous; volcanic glass;; Lithic; debitage; shatter;;;;;;;			1
	2403	Igneous; basalt;; Lithic; debitage; flake;;;;;;;			1
2311	2311	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;		3.5-4.0 cm	1
2311	2311	Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;		2.5-3 cm	1
76T	2403	Igneous; Basalt;; Undetermined; cinder?; fragment;;;;;;;			1
180T	2403	Unidentified stone; unknown;; Unidentified;; stain;; red;;;;;			
2309	2309	Mineral; slate;; Structure?;; angular waste;;;;;;;			2
73T	2403	Mineral; slate;; Structure?;; angular waste;;;;;;;			1
2311	2311	Mineral; mineral; unknown; Unidentified;; fragment;;;;;;;			1
2311	2311	Brick; brick;; Structure; rubble; fragment;;;;;;;			
2313	2313	Cemented matrix; burial fill;; Carpentry; coffin lid; impress. in matrix			
2316	2316	Marine fauna; coral;; Unidentified;; fragment;;;;;;;			2
180T	2403	Marine fauna; shell;; Non-artifact;; fragment;;;;;;;			1
69T	2403	Coal; coal;; Thermal product;; fragments;;;;;;;			
2309	2309	Coal; coal;; Thermal product;; fragments;;;;;;;			
166	2403	Coal; coal;; Thermal product;; fragments;;;;;;;			3
2311	2311	Organic; Bird feather;; Unidentified; manuport; feather;; Brown;;;;			1
180T	2403	Sediment; wood coffin base;; Carpentry; coffin base; sample;;;;;;;			
2316	2316	Synthetic; Plastic tape; clear; Unidentified; manuport; plastic;;;;;;;			1
2309	2309	Tree leaves;; Non-artifact; plant; leaves;;;;;;;			
2311	2311	Aggregate; coralline casing??;; Non-artifact;; fragment;;;;;;;			1

Table B16. Individual I0014, Feature 211/Pit 1, Excavation Unit 46, Date range: ca. 1810-ca. 1900.

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORI	E NO.	WT.
336	2336		Ceramic; Porcelain;; Clothing; button; complete;; simple; White;; opaque			10.6		4	1	
336	2336		Metal; copper alloy;; Clothing; button; fragment;; unknown;;;;;							
336	2336		Metal; copper alloy;; Clothing; button; complete;; unknown;;;;;			17.8				
336	2336		Metal; copper alloy;; Clothing; straight pin?; fragment;;;;;;;;			0.93 mm			1	
336	2336		Metal; ferrous;; Machinery?;; fragment;;;;;;;;						3	
336	2336		Metal; iron;; Unidentified;; fragment;;;;; heavy duty;						1	
336	2336		Metal; iron;; Machinery?; wire; fragment;;; flat/rectangular;;;;						1	
336	2336		Metal; iron;; Structure; pipe; fragment;;;;;;;						1	
336	2336		Metal; ferrous;; Machinery?; wire; fragment;;;;;;;						1	
336	2336		Metal; iron;; Carpentry; nail; fragment;;; cut;;;;						6	
336	2336		Bone; mammal;; Personal artifact; scrimshaw; fragment;;; tan; polished surfaces			23.65 mm			1	
336	2336		Wood; Wood, possible?;; Clothing; button; complete;; simple; Dark brown			17.6		4	1	
336	2336		Wood; Wood, possible?;; Clothing; button; complete;; simple; dark brown			15.2		4	1	
336	2336		Wood; Wood, possible?;; Clothing; button; complete;; simple;;;; dark brown			15.0		4	2	
336	2336		Wood; Charcoal;; Thermal product;; fragments;;;;;;;							
336	2336		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			4.0-5.5cm			5	
336	2336		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			2.5-3.5 cm			10	
336	2336		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			2-2.5 cm			5	
336	2336		Igneous; basalt;; Unidentified; manuport; waterworn pebble;;;;;;;			1-1.5 cm			14	
336	2336		Igneous; basalt;; Lithic; debitage; angular waste;;;;;;;; -						1	
336	2336		Igneous; basalt;; Lithic; debitage; flake;;;;;;;						7	
336	2336		Stone; Chert;; Lithic; debitage; flake;;; tan;;;;;						1	
36	2336		Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			2-2.5 cm			9	
36	2336		Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble			1-1.5 cm			13	
36	2336		Unidentified stone; unidentified; Non-porous; Personal artifact; disc; fragment; tan; discoid						1	
36	2336		Masonry; mortar; unknown; Structure; rubble; fragment;;;;;;;						1	
36	2336		Masonry; mortar; unknown; Structure; rubble; fragments;;;;;;;; -						20	
336	2336		Brick; brick;; Structure; rubble; fragment;;;;;;;						5	
36	2336		Asphalt; tar/stone;; Structure; pavement; fragments;;;;;;;;						10	
36	2336		Marine Fauna; Pearl shell; Mar mollusk; Coating, red-gold; Clothing; button; complete; compound			10.8		2		
36	2336		Marine fauna; Pearl shell; MarMollu;; Clothing; button; fragment;; simple					4		
36	2336		Marine fauna; Pearl shell; coating, dark brown; clothing; button; complete; compound; simple			10.6		4		
36	2336		Marine fauna; pearl shell; coating, red-gold; clothing button; compl.; compound; red/gold/white		10.1		4			
36	2336		Marine fauna/igneous; shell/basalt?;; Non-artifact;; cylindrical fragment						1	
36	2336		Marine fauna?; coral?;; Non-artifact;; fragment;;;;;;;;						2	
36	2336		Organic; Fish?; unknown; Unidentified;; fragment;;; tan;;;;						1	
36	2336		Clay; Clay;; Game piece; marble; complete;;; gray;;;;;			6.17 approx		1		
36	2336		Clay; Clay;; Game piece; marble; complete;;; tan;;;;;			18.46 mm			1	
336	2336		Clays; adobe-like; laterite temper; Structure; tile; fragment;;;;;;;;						14	
336	2336		Coal; coal;; Thermal product;; fragments;;;;;;;						7	
36	2336		Synthetic?; Plastic/hard rubber;; Automotive?; decorative; fragment; Molded;; Black						1	

Table B17. Individual I0014, Feature 211/Pit 1, Excavation Units 45-46, Date range: ca. 1810-ca. 1900.

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK	BORE NO	. WT.
336	2336		Ceramic; Earthenware; yellowware; Hollowware;; rim sherd;; undecorated					1	
336	2336		Ceramic; Earthenware; Yellowware; Hollowware;; body sherd;; undecorated					1	
336	2336		Ceramic; Earthenware; Yellowware; Flatware?;; body sherd;;;;; undecorated					1	
336	2336		Ceramic; Earthenware; Yellowware; Hollowware;; base sherd;;;;; undecorated					1	
336	2336		Ceramic; Earthenware; Pearl- or whiteware?; Hollowware; tea/coffee cup; rim sherd; sponged					1	
336	2336		Ceramic; Earthenware; Pearlware; Unidentified;; body sherd;;;;; undecorated					1	
336	2336		Ceramic; Earthenware; Pearl- or whiteware?; Hollowware;; base sherd; undecorated					1	
336	2336		Ceramic; Earthenware; Pearlware; Flatware;; body sherd; printed;; flow blue					1	
336	2336		Ceramic; Earthenware; Whiteware; Hollowware;; body sherd;;;;; undecorated					1	
336	2336		Ceramic; Earthenware; Whiteware; Flatware?;; body sherd;;;; undecorated					1	
336	2336		Ceramic; Earthenware; Creamware; Hollowware;; body sherd; molded band; undecorated					1	
336	2336		Ceramic; Earthenware; Creamware; Flatware?;; body sherd;;;;; undecorated					1	
325	2325		Ceramic; Earthenware; Creamware; Unidentified;; body sherd; undecorated					1	
336	2336		Ceramic; Earthenware; Pearlware; Flatware; plate; rim sherd; blue/white;;; shell edged					1	
336	2336		Ceramic; Earthenware; Pearlware; Hollowware; bowl; rim sherd;;; blue/green; banded					4	
336	2336		Ceramic; Earthenware; Pearlware; Hollowware;; body sherd; banded - variegated					1	
336	2336		Ceramic; porcelain; off-white paste; hollowware; cup; rim sherd; underglaze; painted;pos famille palett					1	
04	2404		Ceramic; Porcelain; green-gray paste; unidentified; body sherd; blue; underglaze; painted; pos. nanking					1	
04T	2404		Ceramic; Earthenware; Whiteware; Flatware;; body sherd;;;;; undecorated					1	
336	2336		Ceramic; Earthenware; Whiteware; Flatware;; body sherd;;; polychrome;;; painted					1	
336	2336		Ceramic; Earthenware; Whiteware; Unidentified;; body sherd;;;;; undecorated					1	
336	2336		Glass; Unidentified; bottle; body, shoulder frags; molded;; pale green; vertical indentation					2	
336	2336		Glass; Unidentified; vessel; body fragment;;; amber;;;;;					1	
336	2336		Glass; Decorative; vessel; body fragment; molded;; clear;;; diamond pattern;					1	
336	2336		Glass; Structure; window pane; fragment; pressed;; pale green;;;;;				0.20	6	
336	2336		Glass; Decorative?; vessel; body fragment; molded;; aqua; angular;;;;					3	
336	2336		Glass; Beverage; bottle; body, shoulder frags;;; pale green;;;;;					3	
336	2336		Glass; Structure; window pane; fragment; press mold;; pale green; flat; ribbed, one side;				0.60	1	
336	2336		Glass; Structure; window pane?; fragment;; clear;;;;;;				0.40	1	
336	2336		Glass; Decorative; case/ink/perfume?; body fragment; etched;; clear; angular; 3 concentric curves					2	
336	2336		Glass; Tableware; fine vessel; body fragment;; clear;;;;;					1	
336	2336		Glass; Decorative; unidentified; fragment;; compound; clear/opaque white; cylindrical	0.9	0.90		0.30	1	
25	2325		Glass; Beverage; soda/beer bottle; body fragment;; clear;;;;					2	
336	2336		Glass; Beverage; bottle; fragment;;; dark brown;;;;;					3	
336	2336		Glass; Beverage; soda-water bottle; base fragment;; rounded base (1)					32	
336	2336		Glass; Beverage; wine bottle; body fragment;;; dark olive green;;;;					35	
7T	2404		Glass; Unidentified;; fragment;;; green;;;;;					2	
5T	2404		Glass; Unidentified;; fragment;; clear;;;;					1	
4T	2404		Glass; Unidentified;; fragment;;; clear;;;;					2	

Table B17. (cont.)

CAT#	FLD CAT#	ART#	DESCRIPTION	LENGTH V	WIDTH DIAM	THK BORE NO. WT.
2T	2404		Glass; Unidentified;; fragment;;; brown;;;;;			1
3T	2404		Glass; Unidentified;; fragment;; clear;;;;;			1
336	2336		Glass; Beverage; bottle; fragment;;; amber;;;;;			4
336	2336		Glass; Beverage; wine bottle; body fragment;;; light olive green;;;;;			14
36	2336		Glass; Beverage; vessel; body fragment;; green-blue;;;;;			7
36	2336		Glass; Beverage; vessel; body fragment;; green;;;;;			1
25	2325		Glass; Unidentified; unidentified; fragment;;; clear;;;;;			1
28	2328	27.00	Glass; Pers. adornment; bead frag; w/w; compound;tn/pk/rd/pk/wh; spherical; grnd; o/trnlus/o; d/d/s/d	12.15	12.23	1
28	2328	30.00	Glass; Pers. adornment; bead; compl.; wound; compound; tan/pink; spherical; ground; o/o; s/d	10.96	11.06	1
28	2328	31.00	Glass; Pers. adornment; bead; compl.; wound; compound; tan/pink/wh; spherical; ground; o/o/o;s/d/d	10.79	11.10	1
28	2328	32.00	Glass; Pers. adornment; bead; compl.; wound; compound; tan/pink/wh; spherical; ground; o/o/o;s/d/d	11.24	13.29	1
28	2328	33.00	Glass; Pers. adornment; bead; compl.; wound; compound; tn/pk/rd/wh; spherical; ground; o/o/trnls/o; d/d/s/d	11.13	11.56	1
28	2328	34.00	Glass; Pers. adornment; bead; compl.; wound; compound; tn/pk/rd/wh; spherical; ground;o/o/trnls/o; s/d/s/d	12.47	12.44	1
28	2328	35.00	Glass; Pers. adornment; bead; compl.; wound; compound; tn/pk/rd/wh; spherical; ground; o/o/trnls/o; s/d/s/d	11.73	11.81	1
28	2328	36.00	Glass; Pers. adornment; bead; compl.; wound; simple ?; light tan; spherical; ground; opaque; dull	14.04	16.75	1
28	2328	37.00	Glass; Pers. adornment; bead; compl.; wound; compound*;tan/red; spherical; ground; o/trnls; d/d	9.19	8.90	1
28	2328	39.00	Glass; Pers. adornment; bead; compl.; wound; compound*;tan/red; spherical; ground; o/trnls; d/d	8.96	9.32	1
28	2328	41.00	Glass; Pers. adornment; bead; compl.; wound; simple; tan; spherical; ground; opaque; dull;	7.20	8.91	1
25	2325		Metal; iron;; Unidentified;; fragments;;;;; poor;			6
36	2336		Metal; Iron;; Carpentry; nail; complete;;;;;;	5.4		1
36	2336		Metal; Iron;; Carpentry; nail; complete; cut;;; y;;;	5.1		1
36	2336		Metal; Iron;; Carpentry; nail; complete;;;; y;;;	6.6		1
T	2404		Metal; Iron;; Carpentry; nail; fragment;;;;;;;			1
T	2404		Metal; Iron;; Carpentry; nail; fragment; cut;;; y;;			1
36	2336		Metal; Iron;; Carpentry; nail; complete; wire;;; y;;;	3.2		1
36	2336		Metal; Iron;; Carpentry; nail; fragment;;;;;;;			23
36	2336		Metal; Iron;; Carpentry; nail; fragment; cut (1); wire (1); composite with wood;;; y			12
36	2336		Metal; Copper alloy;; Carpentry; nail; fragment; probably cut;;;;;;			12
36	2336		Metal; Iron;; Structure; unidentified; fragment;;; rectangular;;;;			1
T	2404		Metal; Iron;; Carpentry; nail?; fragment;;;;;;;			6
T	2404	803.00	Faunal; bone; mammal; Non-artifact;; fragment;;;;;;;			O
9T	2404	303.00	Wood; Charcoal;; Unidentified;; fragments;;;;;;;			
T	2404		Igneous; Volcanic glass;; Lithic; debitage; fragment;;;;;;;; -	-		
5T	2404		Stone; Chert;; Lithic; debitage; flake;;;;;;;			1

Table B17. (cont.)

	EL D						
CAT#	FLD CAT# ART#	DESCRIPTION	LENGTH	WIDTH	DIAM	THK BORE NO.	WT.
2325	2325	Mineral; slate;; Structure?;; angular waste;;;;;;;				7	
99T	2404	Mineral; slate;; Structure?;; angular waste;;;;;;;				6	
90T	2404	Slag; Slag;; Thermal product; slag?; fragment;;;;;;;				1	
103T	2404	Brick; brick;; Structure; rubble; fragment;;;;;;;					
2325	2325	Brick; brick;; Structure; rubble; fragment;;;;;;;					
96T	2404	Marine fauna; coral;; Unidentified;; fragment;;;;;;;				5	
98T	2404	Marine fauna; coral;; Unidentified;; aggregates, v. small;;;;;;;				2	
102T	2404	Coal; coal;; Thermal product;; fragments;;;;;;;					
2325	2325	Coal; coal;; Thermal product;; fragments;;;;;;;					
108T	2404	Coal; coal;; Thermal product;; fragments;;;;;;;					

Table B18. Individual I0015, Feature 208, Excavation Unit 108, Date range: ca. 1815-ca. 1825.

CAT#	FLD CAT# A	RT#	DESCRIPTION	LENGTH WIDTH	DIAM THK	BOR NO. E	WT.
2321	2321		Glass; Unidentified;; fragment;; brown;;;;			1	
2321	2321		Glass; Unidentified;; fragment;; clear;;;;;			2	
2321	2321		Glass; Unidentified;; fragment;; pale green;;;;;			10	
2321	2321		Metal; Alloy?;; Carpentry; nail; fragment;;;;;;;			1	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			8	
2321	2321		Metal; Iron;; Unidentified;; fragment;;; flat;;;;			5	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			1	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			2	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			2	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;;;;;;;			1	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;;;;;;;			1	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			3	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			3	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			2	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			1	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			2	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;;; y;;;;			1	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;; y;;;			1	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			1	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;; y;;			1	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;; composite with wood;;;;;			3	
2321	2321		Metal; Iron;; Carpentry; nail; fragment;;; y;;;;			1	
2321	2321		Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble		1-1.5 cm	1	
2321	2321		Unidentified stone; unknown;; Unidentified; manuport; waterworn pebble		0.0-0.5 cm	2	
2321	2321		Brick; brick;; Structure; rubble; fragment;;;;;;;			15	
2322		4.00	Cemented matrix;;; Carpentry; coffin wall; bulk sample;;;;;;;				490.50
2321	2321		Coal; coal;; Thermal product;; fragment;;;;;;;				

APPENDIX C: FAUNAL MATERIALS CATALOG

(with Dr. Alan Ziegler's Comments)

Faunal materials are the fragments of bone and other remnants of mammals, birds, and fish that have survived in the archaeological record. Numerous faunal materials were collected from the burial features on the Marin Tower site. Table C1 contains the list of recovered faunal remains from Block I and Table C2, the list from Block II. Table C3 is a short list of non-faunal materials (shell, coral, or vegetative); these are small fragments that could not be identified during initial laboratory sorting and, therefore, were sent to the faunal expert to see if they could be animal or fish remains.

The faunal materials were collected in the field during the screening process and placed in provenience-labeled bags. Smaller fragments were collected in the bulk sediment and artifact bags from each burial and subsequently were sorted out during initial laboratory processing.

The faunal fragments were washed, dried, placed in provenience-labeled bags, and forwarded to the faunal expert. Dr. Alan C. Ziegler examined and identified, as far as possible, all the remains to the lowest taxonomic level. He provided a count of his observations for each provenience and included notes on some of the samples. A copy of his comments (27 October 1992) precedes the tables.

Dr. Ziegler suggests that none of the faunal materials were interred with the burials because none are complete or nearly complete skeletons. Instead he suggests that the faunal materials were already in the sediments into which the grave shafts were dug and/or they were later depositions. His observations agree with our field assessments regarding the faunal deposits. There are two possible exceptions. Individuals I0004 and I0010 in Block I each had a concentration of fish bones mixed with the torso, but again no complete skeletons are represented so it is unlikely the fish were offerings deposited with the burial.

The tables are organized by provenience (i.e., burial feature or individual) within each block. Following the catalog number and burial number, the taxa (with scientific or common name) and skeletal part are presented in alphabetical order. The "Total No." column refers to the number of identifiable bones or bone fragments; "cf." means that the specimen most likely belongs to the taxon named, but (although unlikely) could belong to an extinct, accidental, or very rare form of the identified order, family or genus. "MNI" is the minimum number of mammals, birds or fish of each type. Dr. Ziegler included some defining and/or clarifying remarks for certain specimens.

Dr. Ziegler also identified a few small fragments of human bone or possible human bone (Table C4) that had been separated from the skeletal remains by previous disturbances to the burials. These fragments were examined further by Rona Ikehara-Quebral, the IARII physical anthropologist. If she confirmed the identification, the fragments immediately were placed with the appropriate burial or with the isolate group.

As with the artifacts and the shells, all of the faunal and related materials were reinterred with the burials. They will be placed with their respective burial or with the isolate group in the appropriate block.

ALAN C. ZIEGLER, Ph.D.

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$\texttt{M} \; \texttt{E} \; \texttt{M} \; \texttt{O} \; \texttt{R} \; \texttt{A} \; \texttt{N} \; \texttt{D} \; \texttt{U} \; \texttt{M}$

DATE: 27 October 1992

TO: International Archaeological Research Institute, Inc.

(ATTN.: Mac Goodwin, Historical Archaeologist)

FROM: Alan C. Ziegler, Zoological Consultant

SUBJECT: Identification of faunal material associated with

burials at Marin Tower Site, Honolulu, O'ahu,

received 22 October 1992

I have identified this faunal material to the lowest taxonomic level possible for me, and Kerri is kindly carrying it all in one box to the IARII office along with this MEMO. An INVOICE covering the total of 21 hours spent on this work is also enclosed in a separate envelope, which I would appreciate your handing over to Olivia Athens.

Each of the small labeled plastic bags I received contained primarily the vertebrate faunal remains from a discrete excavation unit (i.e., from a particular burial and feature, test pit, and layer and/or level, etc.). For each of these excavation units I have identified and separated the material into various faunal categories, and placed the remains of each category in an individual stapled plastic bag along with a yellow paper slip giving the name of the particular category represented, and--for vertebrates--the total number (circled) of bones/fragments included, the subtotals of the various elements of the skeleton present, and often a pertinent comment on the material (--but, note, to keep the identification time to a minimum, not the provenience, which appears only on the original labeled plastic container bag kept with the material).

All of these stapled bags from each excavation unit have then been put in a zip-loc sandwich-size or larger plastic bag along with your original labeled plastic container bag. (These various stapled bags are arranged within each zip-loc bag in the same order as the category names appear on the Faunal Category List mentioned below.)

Any remains identified as "Artifact" have similarly been placed in individual stapled bags, with an identification of the animal material or non-faunal substance apparently represented by the original raw material. Additionally, I also segregated and saved in individual stapled plastic bags the non-faunal and invertebrate items encountered, although you are not liable to need some of them.

(MEMO: IARII from A.C. Ziegler, 27 October 1992, page 2.)

To explain the faunal categories used for the present material, I have included with this MEMO a copy of essentially the same general Faunal Category List (revision of 2 October 1992) used in previous work for IARII, which still contains all previously identified categories, and which did not need updating because no new faunal categories were identified in the present material.

It should be noted that when I mention the common or scientific name of genera or species in list explanations of the more generalized faunal categories—as, for example, in "Large Bird" or "Medium Mammal"—unless it is obviously indicated otherwise, I intend these names to convey only an idea of the general size of the animal represented rather than to definitely indicate that any specific taxon mentioned is necessarily present in the material.

For some identifications on the yellow paper slips, I have prefixed the name of a family, genus, or species with "cf.". This means that the material seems extremely close osteologically to the taxon named and quite likely belongs to it, but I cannot entirely rule out the possibility that an extinct, accidental, or extremely rare, morphologically similar form--although, usually of the same order, family, or genus--is represented instead. However, for most later compilation purposes, I would advise simply omitting the "cf." whenever you see it in my identifications--I guess the main reason I use it at all is to let any possible future identifiers examining the bones know that I did realize that in some cases there was an alternative, although unlikely, identification possible.

In regard to minimum number of individuals, if it was obvious that more than one individual was represented by the material in the stapled bag, I have noted on the yellow paper identification slip the number indicated (written as "MNI = ...").

I have not attempted to age birds appearing in the material, except to note on the yellow slips any obviously immature (usually meaning nestlings in species other than chicken and other precocial groundliving birds) bones present, lack of any such notation meaning that the bird bones are apparently of adult individuals.

For mammals other than rodents, whenever possible I have endeavored to give a general idea of age at death (in the case of appropriate material often estimating the probable minimum and/or maximum chronological age at death by reference to published tables--when available--of dental replacement sequence or stage of long-bone epiphyseal union).

You may already routinely present the following in each of your archaeological excavation reports but, in case you do not, I hope you will consider including a minimal faunal-data table in each such final paper. That is, a simple table (similar to the sample included as an ATTACHMENT to this MEMO) for each test pit or other equivalent area, giving at least the actual numbers and/or weights of the bones/fragments per level assigned to each faunal category that occurs in the excavation unit. This is so possible future

(MEMO: IARII from A.C. Ziegler, 27 October 1992, page 3.)

investigators will always have available these raw faunal data, along with other information such as excavation-unit volumes contained in your report, for use in faunal analysis calculations that, for one reason or another, you may not have carried out.

As I mentioned to you previously, I usually do not write up a formal faunal analysis report per se (--having found that, in terms of the amount that would have to be paid for my time, this is much more expeditiously done by personnel who either actually participated in the field work or, at least, have more ready access to the complete original excavation data than I do--) but, instead, I usually provide a series of general and specific, largely subjective, comments (as I have done below) regarding the identified faunal material. I would assume the comments would be most meaningful to you when considered jointly with any tabulation you may make of the material. These comments can then be quoted or paraphrased, or the information contained in them otherwise utilized in the manner best suited to the style of the final overall project report.

COMMENTS ON MARIN TOWER BURIAL-ASSOCIATED FAUNAL MATERIAL

As you mentioned in your 21 October 1992 transmittal letter, there apparently was some fragmentary human bone material in the faunal lot received. I have separated all of such possible material that seemingly has the "look" and "feel" of human bone from the osseous material of, apparently, other mammals of about the same general body size, and categorized it as "cf. Homo sapiens". I think it would probably be fairly safe to add this latter material to the more-certainly identified human remains from the corresponding burial. Other than in the case of a couple of non-adults apparently represented, I have not attempted to give a chronological age to any of this possible human material.

With the apparent exception of two instances involving fish noted in the same transmittal letter, I get the impression that not too much of the present faunal material accompanied the bodies in the coffins when they were interred, that is, most of it was simply already in--or later deposited in--the matrix of the burial site when the interment was made. I say this because most of the recovered remains of a given species at each burial site at least seem to consist of only a few isolated bones--not the associated partial or essentially complete skeleton I would expect in the case of burial offerings. (An exception, in addition to the two fish, might be an adult chicken that, as I remember, was represented by a number of unduplicated bones in one burial lot.)

Even in the case of the previously mentioned fish, it appears that only part of the body of each may have accompanied the burial. That is, in at least one of these instances I did find a number of like-sized vertebrae, some ribs, and a spine, but encountered no mouthparts, other skull bones, or even other larger bones, with

(MEMO: IARII from A.C. Ziegler, 27 October 1992, page 4.)

these. (I presume the field bone recovery would, of course, have been thorough enough to have collected most of such bones if originally present -- a lot of these would have been larger than those skeletal elements actually recovered.)

There were occasional fish mouthparts present, but most or all of these did not seem to be accompanied by any significant number of other bones of the body from what would seem to be the same individual fish.

Three or so dorsal spines of a few very small "Monacanthid" (Filefishes; genus Pervagor) occur among the collective fish material, but I suspect these few individuals may be animals that washed ashore after dying naturally at sea, then were somehow transported to the site, rather than being individuals taken for food and/or placed in coffins.

Most of the "Medium Bird" material certainly looks like it represents the family Procellariidae (Shearwaters, etc.) rather than, for example "cf. Gallus gallus (= chicken ±), but it and the "Medium Procellariid" material is almost always so dissociated and fragmented that I doubt very much, if any, represents burial food offerings.

Incidentally, the occasional "Medium Artiodactyl" bone identified is very likely goat and/or sheep ("Capra hircus/Ovis sp.") but, because no identifiable postcanine tooth fragments were present, I could not definitely eliminate deer. (Although now restricted to Hawaiian Islands other than O'ahu, at least Axis Ax

I hope this information may be of interest and use to you. Please be sure to let me know if there are any questions on any of my procedures, identifications or comments. Many thanks for the chance to work on this material—and continued best in everything!!

* * *

Table C1. Faunal Materials from the Block I Burials.

Cat.	Burial	Class	Part	Total	MNI	Remarks
No.	No.			No.		
1114	10002	Capra hircus/ovis or cf. Bos taurus	postcanine tooth fragment	1	1	
1114	10002	Fish	scale	1	1	
1114	10002	Medium Artiodactyl	podial	1	1	
1114	10002	Medium bird	limb bone fragment	1		
1114	10002	Medium bird	limb bone fragment	1	1	
1114	10002	Medium bird	pedal phalanx	1	1	
1114	10002	Medium vertebrate	bone fragment	1	1	
	10002	Puffinus	tarsometatarsus	1	1	
1114	10002	Small Procellariid	radius	1	1	
1114	10002	Small-to-medium and/or medium mammal	bone fragments	10		1 bone fragment quite immature
1114	10002	Small-to-medium and/or medium mammal	limb bone fragments	5		
1114	10002	Small-to-medium and/or medium mammal	rib	1		rib fragment quite immature
1114	10002	Small-to-medium and/or medium mammal	vertebra	1	1	
35	10002	cf. Small-to-medium or medium mammal	vertebra(?)	1	1	
37T	10002	Medium bird	coracoid	1	1	not chicken
37T	10002	Medium mammal	limb bone fragment	1	1	
37T	10002	Medium vertebrate	carapace, plastron, or cranium	1	1	Sea Turtle, or other mammal, other than a smal species
37T	10002	Small-to-medium and/or medium mammal	bone fragments	2		•
37T	10002	Small-to-medium and/or medium mammal	cranium(?)	1	1	
37T	10002	Small-to-medium and/or medium mammal	limb bone fragment	1		
1116	10003	Capra hircus/ovis	milk(?) premolar	1	1	probably about 10-15 or so months old
1116	10003	Fish	bone fragment	1		
1116	10003	Fish	vertebra	3	1	fish length=20-25 or 30 cm
1116	10003	Medium Procellariid	coracoid	1	1	
1116	10003	Medium Procellariid	humerus	1		
1116	10003	Medium Procellariid	manual phalanx	1	1	
1116	10003	Medium bird	limb bone fragments	2		
1116	10003	Medium bird	limb bone fragments	4	1	probably not Gallus gallus
1116	10003	Medium bird	pedal phalanx	1		_
1116	10003	Medium bird	tarsometatarsus	1	1	one fragment is quite immature
1116	10003	Medium mammal	bone fragments	3	1	
1116	10003	Medium mammal	extremity bone fragment	1		

Table C1. (cont.)

Cat.	Burial	Class	Part	Total	MNI	Remarks
No.	No.			No.		
1116	10003	Medium mammal	limb and/or extremity bone	2		
	10003		fragment	-		
1116	10003	Medium vertebrate	bone fragments	10	1	
1116	10003	Puffinus	lower mandible	1	1	
1116	10003	Puffinus	tibiotarsus	1	•	
1116	10003	Scarid Calotomus	lower pharyngeal plate	1	1	
1116	10003	Sea Turtle	cf. carapace or plastron	1	_	
1116	10003	Sea Turtle	cranium	1	1	
1116	10003	Small-to-medium and/or medium mammal	bone fragments	2	1	
1116	10003	Small-to-medium and/or medium mammal	cranium and/or dentary(?)	2	1	
1116	10003	Small-to-medium and/or medium mammal	limb and/or extremity bone	2		
			fragment			
1116	10003	Sus scrofa	adult upper canine(?)	1	1	if correctly identified, then at least 1 year old
1116	10003	Sus scrofa	phalanx	1		
1118	10004	Canis familiaris	adult upper 4th premolar	1	1	at least 6 months old
1118	10004	Canis familiaris	metapodial	1		
1118	10004	Fish	bone fragments	3		
1118	10004	Fish	bone fragments	4		
1118	10004	Fish	vertebra	1	1	fish length=18-20 or 23 cm
1118	10004	Fish	vertebra	1	1	fish length=20-25 cm
1118	10004	Fish	vertebra	5	1	fish length=15-20 cm
1118	10004	Medium Procellariid	humerus	1	1	
1118	10004	Medium Procellariid	radius	1		
1118	10004	Medium bird	carpometacarpus	1	1	not chicken; most or all may be Medium
						Procellariid
1118	I0004	Medium bird	femur	1		
1118	10004	Medium bird	humerus	1	1	probably not chicken
1118	10004	Medium bird	limb bone fragment	1		
1118	10004	Medium bird	pedal phalanx	1		
1118	I0004	Medium bird	radius(?)	1		
1118	I0004	Medium vertebrate	bone fragment	1	1	Sea Turtle or mammal (other than a small
						species)
1118	I0004	Monacanthid Pervagor	dorsal spine	1	1	

Table C1. (cont.)

Cat.	Burial	Class	Part	Total	MNI	Remarks
No.	No.			No.		
1118	10004	Rattus exulans	femur	1	1	
1118	10004	Shark or Ray	vertebra	2	1	
1118	10004	Small-to-medium and/or medium mammal	bone fragments	3	1	
1118	10004	Small-to-medium and/or medium mammal	bone fragments	4	_	
1118	10004	Small-to-medium and/or medium mammal	limb bone fragments	4		
1118	10004	Small-to-medium and/or medium mammal	vertebra	1	1	
1118	10004	Small-to-medium or medium mammal	limb(?) bone fragment	1	1	
1118	10004	Sus scrofa	unerupted adult 4th upper	1	1	exact age(?),but probably between 2-3 and 6-8
			premolar			months old
??	10004	Fish	bone fragments	22		
??	10004	Fish	vertebra	9	1	fish length=15-20 cm
??	10004	Sus scrofa	adult lower 1st incisor	1	1	at least 1-1 1/4 years old
0001	10005	Large mammal	rib fragment	1	1	many smaller fragments associated with larger fragment so counted as 1 only
1128	10009	Medium bird	limb bone fragment	1		, ,
1128	10009	Medium bird	radius(?)	1	1	radius is somewhat immature
1128	10009	Small-to-medium and/or medium mammal	bone fragment	1		
1128	10009	Small-to-medium and/or medium mammal	limb and/or extremity bone	2	1	
			fragment			
1130	I0010	Fish	bone fragment	1	1	
1130	I0010	Fish	bone fragments	6		
1130	I0010	Fish	scale(?)	1		
1130	10010	Fish	vertebra	1	1	fish length=25-30 cm
1130	I0010	Medium Procellariid	carpometacarpus	1		immature
1130	I0010	Medium Procellariid	coracoid	1	1	
1130	I0010	Medium Procellariid	humerus	2		
1130	I0010	Medium Procellariid	radius	1		
1130	I0010	Medium Procellariid	ulna	1	1	
1130	I0010	Medium bird	limb bone fragments	6		
1130	10010	Medium bird	vertebra	1	1	little if any is Gallus gallus; at least one fragment is immature
1130	I0010	Medium mammal	limb or extremity bone fragment	1		-
1130	10010	Medium mammal	phalanx	1	1	

Table C1. (cont.)

Cat.	Burial	Class	Part	Total	MNI	Remarks
No.	No.			No.		
1130	10010	Medium vertebrate	bone fragments	5	1	
1130	10010	Puffinus	tarsometatarsus	2	1	
1130	10010	Sea Turtle or Small-to-medium or medium mammal	bone fragment	1	1	cut or metal-sawed
1130	10010	Shark or Ray	vertebra	1	1	
1130	I0010	Small-to-medium and/or medium mammal	bone fragments	9		
1130	10010	Small-to-medium and/or medium mammal	cranium	1	1	
1130	I0010	Small-to-medium and/or medium mammal	tooth fragments	2		
1130	I0010	Sus scrofa	phalanx	1	1	exact age(?), but probably at least 1 year old
1130	10010	cf. Felis cattus	dentary	1	1	probably adult or essentially so
1130	10010	cf. Medium Anatid	ulna	1	1	at upper end of size range
1130	10010	cf. Medium or large mammal	bone (or ivory?) fragment	1	1	
1130	10010	cf. Sea Turtle	cf. rib or plastron fragment	1	1	
??	I0010	cf. Small-to-medium or medium mammal	bone fragment	1	1	associated with I0010 bundle; placed with the burial
0120	I0012	Fish	bone fragment	1	1	
0120	I0012	Medium bird	limb bone fragments	5	1	
??	I0012	Medium Procellariid	carpometacarpus	1		
??	I0012	Medium Procellariid	ulna	1	1	
??	I0012	Medium bird	limb bone fragments	6		
??	I0012	Medium bird	ulna	1	1	not chicken; most or all might be Medium Procellariid but too fragmented to be sure
??	10012	Medium bird	vertebra	1		č
??	I0012	Small Passeriform	carpometacarpus	1	1	
0077	10016	Canis familiaris	(adult) lower 1st molar	1	1	at least 6 months old
0077	10016	Canis familiaris	(adult) upper 2nd molar	1		
0077	I0016	Medium bird	limb bone fragment	1	1	
0077	10016	Medium vertebrate	bone fragment	1		
0077	10016	Medium vertebrate	limb bone fragment	1	1	probably both are bird and/or mammal
0077	10016	Monacanthid Pervagor	dorsal spine	1	1	
0077	10016	Small-to-medium and/or medium mammal	bone fragment	1		
0077	10016	Small-to-medium and/or medium mammal	limb(?) bone fragment	1	1	
0077	10016	cf. Medium Procellariid	humerus	1	1	
1134	10017	Fish	bone fragments	3		

Table C1. (cont.)

Cat.	Burial	Class	Part	Total	MNI	Remarks
No.	No.			No.		
1134	10017	Fish	vertebra	8	3	fish lengths=15-20 or 25 cm, 25-28 or 30 cm, possibly 30-35 cm
1134	10017	Medium Procellariid	radius	1		
1134	10017	Medium Procellariid	ulna	1	1	
1134	10017	Medium bird	limb bone fragment	1	1	
1134	I0017	Medium vertebrate	bone fragments	8	1	2 fragments might be H. sapiens cranium, but could also be Sea Turtle so just included here
1134	I0017	Rattus exulans	innominate	1	1	,
1134	I0017	Small-to-medium and/or medium mammal	bone fragments	6		
1134	I0017	Small-to-medium and/or medium mammal	limb(?) bone fragment	1		
1134	I0017	Small-to-medium and/or medium mammal	podial(?)	1	1	
1134	I0017	Sus scrofa	postcanine tooth fragment	1	1	age(?)
1139	I0017	Fish	bone fragment	1		
1139	I0017	Fish	bone fragments	3	1	
1139	I0017	Fish	bone fragments	30		
1139	I0017	Fish	pharyngeal(?) plate	1		
1139	I0017	Fish	scale	1		
1139	I0017	Fish	scale(?)	1		
1139	I0017	Fish	scales	5		
1139	I0017	Fish	urohyal(?)	1	1	
1139	I0017	Fish	vertebra	5	2	fish lengths=8-10 cm, 15-20 or 23 cm
1139	I0017	Medium Procellariid	scapula	1	1	
1139	I0017	Medium bird	limb bone fragment	1		
1139	I0017	Medium bird	synsacrum	1	1	
1139	I0017	Small Passeriform	pedal ungual phalanx	1		
1139	I0017	Small Passeriform	scapula	1	1	
1139	I0017	Small and/or medium bird	limb bone fragments	12		
1139	I0017	Small and/or medium bird	pedal phalanx	3	1	probably none is chicken
1139	I0017	Small and/or medium vertebrate	bone fragments	4	1	
1139	I0017	Small and/or medium vertebrate	bone fragments	27		
1139	I0017	Small and/or medium vertebrate	tooth(?) fragment	1	1	
1139	I0017	Small-to-medium and/or medium mammal	bone fragments	2		
1139	I0017	Small-to-medium and/or medium mammal	tooth fragment	1	1	
1139	I0017	cf. Carangid	cf. posterior lateral line scute	1	1	
1139	I0017	cf. Small-to-medium or medium mammal	bone fragment	1	1	

Table C2. Faunal Materials from the Block II Burials.

	l		_		l	
Cat.	Burial	Class	Part	Total	MNI	Remarks
No.	No.			No.		
0185	10005	Canis familiaris	adult upper(?) canine fragment	1	1	at least 6 months old
0185	10005	Fish	bone fragment	1	_	at react o months ora
0185	10005	Fish	vertebra	1	1	fish length=18-20 or 23 cm
0185	10005	Large mammal	humerus(?)	1	1	5
0185	10005	Medium mammal	limb bone fragment	1	1	scratched on outer surface
0185	10005	Medium or large mammal	limb bone fragment	1	1	
0185	10005	cf. Felis cattus	metapodial	1	1	relatively immaturebetween 1/3 and 1/2 grown
2293	10005	Fish	bone fragment	1	1	
2293	10005	Fish	scale	1	1	
2293	10005	Medium Procellariid	humerus	1	1	
2293	10005	Medium bird	limb bone fragment	1		
2293	10005	Medium bird	scapula(?)	1	1	scapula fragment may be chicken, but not certain
2293	10005	Medium vertebrate	bone fragments	2	1	
2293	10005	Scarid Calotomus	upper pharyngeal plate	1	1	
2293	10005	Small-to-medium and/or medium mammal	bone fragments	4	1	
2293	10005	cf. Medium vertebrate	bone fragments	5	1	
2294	10005	Medium Procellariid	humerus	1	1	
2294	10005	Medium mammal	tibia	1	1	closer to Medium Artiodactyl than Sus scrofa but
						not certain
2294	10005	Puffinus	tibiotarsus	1	1	
2294	10005	Small-to-medium or medium mammal	bone fragment	1	1	
2278	10006	Medium Procellariid	furcula	1		
2278	10006	Medium Procellariid	quadrate	1	1	
2278	10006	Medium bird	limb bone fragments	2		
2278	10006	Medium bird	vertebra	1	1	
2278	10006	Medium vertebrate	bone fragments	2	1	
2278	10006	cf. Balistid(?)	scale(??)	1	1	if identified correctly, then this family is probably
						correct
2278	10006	cf. Small-to-medium and/or medium mammal	bone fragments	3	1	
2298	10006	Fish	bone fragments	3	1	
2298	10006	Medium bird	bone fragment	1		
2298	10006	Medium bird	limb bone fragments	4	1	
2298	10006	Small and/or medium vertebrate	bone fragments	2	1	
2299	I0006	Fish	bone fragment(?)	1	1	

Table C2. (cont.)

Cat. No.	Burial No.	Class	Part	Total No.	MNI	Remarks
2299	10006	Fish	scale	1		
2280	10006/7	Fish	premaxillary or dentary	1	1	possibly Scarid, but not sure
2280	10006/7	Medium bird	bone fragment	1	_	F
2280	10006/7	Medium bird	carpometacarpus	1		
2280	10006/7	Medium bird	femur	1		
2280	10006/7	Medium bird	limb bone fragments	18		
2280	10006/7	Medium bird	pedal phalanx	2		
2280	10006/7	Medium bird	radius	1	1	most of total bone is Medium Procellariid but too fragmented to be sure
2280	10006/7	Rattus exulans	humerus	1	1	
2292	10006/7	Medium Procellariid	radius	2	1	
2292	10006/7	Medium bird	limb bone fragments	3	1	not chicken
2292	10006/7	cf. Small-to-medium or medium mammal	bone fragment	1	1	
2298	10006/7	Fish	bone fragments	3	1	
2298	10006/7	Fish	scales	3		
2298	I0006/7	Medium bird	limb bone fragments	5	1	
2298	10006/7	Medium vertebrate	bone fragments	5	1	
2298	I0006/7	cf. Small-to-medium and/or medium mammal	bone fragments	4	1	
2299	10006/7	Fish	scales	3	1	
2299	10006/7	Medium bird	bone fragments	6		
2299	10006/7	Medium bird	limb bone fragments	2	1	
2299	10006/7	Medium bird	limb bone fragments	7		
2299	10006/7	Medium bird	synsacrum	7	1	
2299	10006/7	Medium bird	vertebra	2		
2299	10006/7	Rattus	tibiofibula	1	1	
2299	10006/7	Rattus	vertebra	1		
2299	10006/7	Small or medium vertebrate	bone fragment	1	1	probably either Fish or bird of unknown size
2299	10006/7	cf. Small-to-medium or medium mammal	bone fragment	1	1	
??	10006/7	Sus scrofa	adult lower 3rd incisor	1	1	at least 11-12 months old
2295	10008	Fish	scale	1	1	
2295	10008	Medium bird	limb bone fragment	1	1	
2295	10008	Small or medium vertebrate	bone fragment	1	1	probably either Fish or bird of unknown size
0177	I0013	Medium bird	pedal phalanx	1	1	not chicken
2309	I0013	Fish	scale	1	1	

Table C2. (cont.)

Cat. No.	Burial No.	Class	Part	Total No.	MNI	Remarks
2309	10013	Fish	scales	4	1	
2309	10013	Medium vertebrate	bone fragments(?)	i	1	
2311	10013	Fish	bone fragments(?)	3	1	
2311	10013	Fish	scale	1		
2311	10013	Fish	scales	18	1	
2311	10013	Fish	vertebra	1	1	fish length=18-20 or 23 cm
2311	10013	Medium Procellariid	manual phalanx	1	1	non length 10 20 of 25 cm
2311	10013	Medium bird	femur	1	1	not chicken
2311	10013	Medium bird	limb bone fragments	2	1	not chicken
2311	10013	Medium bird	limb bone fragments	6		not emeken
2311	10013	Medium bird	manual or pedal phalanx	1		
2311	10013	Medium bird	tarsometatarsus	1	1	not chicken
2311	10013	Small and/or medium vertebrate	bone fragments	2	1	
2311	10013	Small or medium vertebrate	bone fragments	1	1	
2311	10013	Small-to-medium or medium mammal	tooth fragment	1	1	
2316	I0013	Fish	scale	1	1	
2316	10013	Monacanthid Pervagor	dorsal spine	1	1	
??	I0013	Fish	scales	2	1	
??	I0013	Medium Procellariid	furcula	2	1	most of total bone is probably Medium Procellariid but too fragmented to be certain
??	I0013	Medium Procellariid	limb bone fragments	12		Trocommu out too magmement to be certain
??	10013	Medium Procellariid	pedal phalanx	1		
??	I0013	Medium Procellariid	tarsometatarsus	1		
??	I0013	Medium Procellariid	vertebra	3		
??	I0013	Monacanthid Pervagor	dorsal spine	1	1	
??	10013	Small and/or medium vertebrate	bone fragments	10	1	
??	10013	cf. Medium Procellariid	cranium	1	l i	
??	10013	cf. Medium Procellariid	quadrate	1		
??	I0013	cf. Small-to-medium or medium mammal	cf. tooth fragment	li	1	
0096	10014	cf. Small-to-medium or medium mammal	bone fragment	1 1	1	
0101	10014	Fish	bone fragment	ĺi	l i	
0101	10014	Medium Procellariid	humerus	li	l i	
0101	10014	Medium bird	femur	2	1	

Table C2. (cont.)

Cat. No.	Burial No.	Class	Part	Total No.	MNI	Remarks
0101	I0014	Medium bird	humerus	2	1	not chicken; most is probably Medium Procellariid but too fragmented to be sure
0101	I0014	Medium bird	limb bone fragments	4		
0101	I0014	Medium bird	tibiotarsus	1		
0101	I0014	Medium bird	vertebra	2		
0101	I0014	Small or medium vertebrate	bone fragment	1	1	
2324	I0014	Fish	scale	1	1	
2324	I0014	Medium bird	carpometacarpus	1		
2324	I0014	Medium bird	coracoid(?)	1	1	not chicken; most is probably Medium Procellariid but too fragmented to be sure
2324	I0014	Medium bird	femur	1		
2324	I0014	Medium bird	limb bone fragments	4		
2324	I0014	Medium bird	pedal phalanx	1		
2324	I0014	Medium bird	synsacrum	1		
2324	I0014	Medium bird	vertebra	1	1	
2324	I0014	Medium bird	vertebra	2		
2324	I0014	Puffinus	cranium	1	1	
2324	I0014	Puffinus	tibiotarsus	1		
2324	I0014	Scarid Scarus	tooth of upper pharyngeal plate	1	1	
2324	I0014	Small-to-medium or medium mammal	limb bone fragment	1	1	
2325	I0014	Fish	bone fragment	1	1	
2325	I0014	Fish	scales	4		
2325	I0014	Medium Procellariid	humerus	1	1	
2325	I0014	Medium bird	femur	1	1	not chicken
2325	I0014	Medium bird	limb bone fragments	3		
2325	I0014	Medium bird	pedal phalanx	1		
2325	I0014	Medium bird	vertebra	5		
2325	I0014	Small or medium vertebrate	bone fragment	1	1	
2325	I0014	cf. Small-to-medium or medium mammal	bone fragments	1	1	
2336	I0014	Acanthurid	pharyngeal(?) plate	1	1	
2336	I0014	Canis familiaris	(adult) upper 1st molar	1	1	at least 6 months old
2336	I0014	Canis familiaris	(adult) upper 2nd molar	1		
2336	I0014	Canis familiaris	ad. up. 4th premolar or (ad.) low. 1st molar	1		

Table C2. (cont.)

Cat. No.	Burial No.	Class	Part	Total No.	MNI	Remarks
2336	I0014	Carangid	posterior lateral line scute	1	1	
2336	10014	Fish	bone fragments	2	1	
2336	10014	Fish	bone fragments	7		
2336	10014	Fish	scale(?)	1		
2336	10014	Fish	scales	2		
2336	10014	Fish	vertebra	9	5	fish lengths=15-20 cm, 20-25 cm, 25-30 cm, 30- 35 cm, 40-50 or 55 cm
2336	I0014	Large bird	vertebra	1	1	
2336	I0014	Large mammal	bone fragment	1		
2336	I0014	Large mammal	bone fragments	14	1	metal-sawed
2336	I0014	Large mammal	vertebra(?)	1	1	
2336	I0014	Medium and/or large mammal	bone fragments	27		
2336	I0014	Medium and/or large mammal	limb bone	1		
2336	I0014	Medium and/or large mammal	vertebra	4	1	
2336	I0014	Medium bird	manual phalanx	1	1	bone fragment may be cf. Gallus gallus; slightly immature
2336	I0014	Medium bird	synsacrum	1	1	bone fragment might be cf. Gallus gallus
2336	I0014	Medium bird	vertebra	1		bone fragment might be cf. Gallus gallus
2336	I0014	Medium vertebrate	bone fragment	1	1	
2336	I0014	Rattus rattus and/or Rattus norvegicus	sacrum	1	1	big!
2336	I0014	Rattus rattus and/or Rattus norvegicus	vertebra	1		
2336	I0014	Scarid	tooth, lower (or upper) pharyngeal plate	1	1	
2336	10014	Scarid Scarus	lower pharyngeal plate	1	1	
2336	I0014	Sus scrofa	(adult) lower 1st and/or 2nd molar	2		
2336	10014	Sus scrofa	(adult)[upper or lower?] 3rd molar	1		
2336	10014	Sus scrofa	adult lower 3rd and/or 4th premolar	2		
2336	10014	Sus scrofa	adult upper 2nd incisor	1	2	1=about 12 months old, 1=15-18 months old
2336	10014	Sus scrofa	metapodial	2		,
2336	10014	Sus scrofa	postcanine tooth fragment	1		
2336	10014	Sus scrofa	ungual phalanx	1		

Table C2. (cont.)

Cat.	Burial	Class	Part	Total	MNI	Remarks
No.	No.			No.		
2336	I0014	cf. Gallus gallus	pedal phalanx	1		
2336	10014	cf. Gallus gallus	quadrate	1	1	female
2336	10014	cf. Gallus gallus	synsacrum	1		
2336	10014	cf. Gallus gallus	tarsometatarsus	1		
2336	I0014	cf. Gallus gallus	tibiotarsus	2		
2336	I0014	cf. Small-to-medium and/or medium mammal	bone fragment	1		
2336	I0014	cf. Small-to-medium and/or medium mammal	limb(?) bone fragment	1	1	
??	10014	Acanthurid	pharyngeal(?) plate	1	1	
??	10014	Fish	bone fragments	40		
??	10014	Fish	vertebra	1	1	fish length=15-20 or 23 cm
??	10014	Medium Procellariid	carpometacarpus	1	1	
??	10014	Medium and/or large mammal	bone fragments	390		
??	I0014	Medium and/or large mammal	cranium	5	1	some fragments of total bone may be H. sapien but too fragmented to be sure
??	10014	Medium and/or large mammal	limb bone fragments	3		č
??	I0014	Medium bird	bone fragments	5		
??	10014	Medium bird	femur(?)	1		
??	10014	Medium bird	limb bone fragments	8		
??	10014	Medium bird	rib	1		
??	I0014	Medium bird	sternum(?)	1	1	most fragments of total bone are probably cf. Gallus gallus
??	I0014	Medium bird	synsacrum	2		
??	10014	Medium bird	vertebra	4		
??	10014	Medium vertebrate	bone fragments	7	1	
??	10014	Rattus rattus or Rattus norvegicus	vertebra	1	1	big!
??	10014	Small-to-medium and/or medium mammal	bone fragments	5		
??	10014	Small-to-medium and/or medium mammal	cranium	1	1	
??	I0014	Small-to-medium and/or medium mammal	cranium or dentary	1		
??	I0014	Small-to-medium and/or medium mammal	limb bone fragments	4		
??	I0014	Small-to-medium and/or medium mammal	phalanx	2		
??	10014	Small-to-medium and/or medium mammal	tooth fragment	4		
??	10014	Small-to-medium and/or medium mammal	ulna(?)	1		
??	I0014	Small-to-medium and/or medium mammal	vertebra	2		
??	I0014	Sus scrofa	dentary	1	1	at least 12 months old

Table C2. (cont.)

Cat. No.	Burial No.	Class	Part	Total No.	MNI	Remarks
?? ?? ?? ?? ?? 2321 2321 2321 2321 2321	10014 10014 10014 10014 10015 10015 10015 10015 10015 10015 10015 10015 10015	Sus scrofa cf. Gallus gallus cf. Gallus gallus cf. Gallus gallus cf. Gallus gallus Fish Medium bird Medium bird Medium bird Medium bird Medium bird Small-to-medium or medium mammal cf. Large bird cf. Large mammal	postcanine carpal femur sternum vertebra scales bone fragments limb bone fragment manual phalanx vertebra bone fragments tibiotarsus bone fragments vertebra(?)	1 1 2 1 7 1 1 1 2 1 1 2 1 3	1 1 1 1 1	not chicken not chicken not chicken not chicken

Table C3. Non-Faunal Materials from the Block I and Block II Burials.

Individual	Non-Faunal Material
10002 10002/10011 10003 10004 10005 10006 10007 10008	charcoal worked bone fragment mollusk, charcoal mollusk mollusk, metal, glass mollusk, crustacean, glass, brick(?), metal, charcoal, elongated bone (ivory??) bead?? mollusk, crustacean, worked(?) wood, charcoal mollusk
10009 10010 10011 10013 10014 10016 10017	2 worked wood fragments w/ nails or screws, charcoal mollusk wood from coffin with one nail crustacean, mollusk, echinoderm, worked(?) wood, 2 possible gastroliths mollusk, crustacean, echinoderm, glass, sponge, ceramics, metal charcoal, mollusk crustacean, mollusk, echinoderm

Table C4. Isolated Human Remains from Block I.

Cat.	Burial	Class	Part	Total	MNI	Remarks
No.	No.			No.		
1073		Homo sapiens	hand phalanx	1		
1073		Homo sapiens	tooth crown fragment	1	1	if tooth identifications are correct, 1=about 2-3 years old, 1=at least teenaged (if not much more)
1073		Homo sapiens	upper deciduous canine	1	1	if tooth identifications are correct, 1=about 2-3 years old, 1=at least teenaged (if not much more)
1075		Homo sapiens and cf. Homo sapiens	1st metatarsal-left	1	1	at least 17-18 years old (if not much more)
1075		Homo sapiens and cf. Homo sapiens	cranium fragment	1		only tentatively referred to this category
1075		Homo sapiens and cf. Homo sapiens	cuneiform (3rd?) fragment	1		
1075		Homo sapiens and cf. Homo sapiens	metatarsal shaft fragment	1		
1075		Homo sapiens and cf. Homo sapiens	rib fragments	2		
1075		Homo sapiens and cf. Homo sapiens	vertebral centrum fragment	1		
1098		Homo sapiens	upper right central incisor w/marked shovelling	1	1	at least 9-10 years old
1122		Homo sapiens and cf. Homo sapiens	bone fragments	35		possibly human or "Medium mammal"
1122		Homo sapiens and cf. Homo sapiens	ilium	1	1	human, probably 2-5 years old
1122		Homo sapiens and cf. Homo sapiens	metapodial	1		human, probably 2-5 years old
1122		Homo sapiens and cf. Homo sapiens	vertebra	1		possibly human or "Medium mammal"
1116	10003	cf. Homo sapiens(?)	bone fragments	10	1	Age(?); if not H.s., then should be Small-to-medium and/or medium mammal
1118	10004	cf. Homo sapiens	bone fragments	14	1	placed with burial remains
1128	10009	cf. Homo sapiens	bone fragments	34		
1128	10009	cf. Homo sapiens	limb bone fragment	1		
1128	10009	cf. Homo sapiens	ulna, radius, or fibula	1	1	possibly at least middle-aged; if not H.s., then Small-to-medium and/or medium mammal
1128	10009	cf. Homo sapiens	vertebra	3		
1130	10010	cf. Homo sapiens	(cf. sternal end of) rib	2	1	exact age(?), but at least several years old
1139	I0017	cf. Homo sapiens	bone fragments	38	1	placed with burial remains

APPENDIX D:

SHELL CATALOG

Shells and shell fragments were found in varying concentrations in direct association with the Marin Tower burials. The field archaeologists collected them by provenience in the sifting screens along with the other non-human skeletal remains. After initial processing in the IARII laboratory, Greig Nakamura (IARII lab technician) sorted, identified to the lowest possible taxon, and weighed the shells. Table D1 lists the identified shell remains recovered from the Block I burials and Table D2 lists them for the Block II burials.

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Table D1. Shells Recovered from the Block I burials.

Burial No.	Field No.	Exc. Unit	Feature	Species	Total No.	Wt. g	MNI
10002	37			Brachidontes crebristriatus	192	34.06	71
10002	37			Conus	6	27.01	1
10002	37			Crepidula	2	.52	2
10002	37			Cymatium	5	4.67	
10002	37			Cypraea	1	.58	
10002	37			Drupa	1	.76	
10002	37			Hipponix	4	.60	4
10002	37			Isognomon	28	5.06	7
10002	37			Nassarius olomea	4	.86	3
10002	37			Naticidae	1	.34	1
10002	37			Nerita	34	9.65	30
10002	37			Operculum	1	.56	1
10002	37			Ostra sandvicensis	5	1.95	1
10002	37			Pinctada	20	10.01	4
10002	37			Sea Urchin		.11	
10002	37			Tellina palatam	90	38.46	5
10002	37			Trochus	3	3.02	
10002	37			Turbo	1	.90	
10002	37			unidentifiable	7	2.69	
10002	154	34		Conus	1	1.08	
10002	1114		9	Sea Urchin	1	.22	
10002	1114		9	unidentifiable(worn)	1	.68	
10004	1118	88/32	6	Brachidontes crebristriatus	160	18.96	20
10004	1118	88/32	6	Conus	9	17.17	
10004	1118	88/32	6	Crepidula	1	.08	1
10004	1118	88/32	6	Cymatium	2	1.31	1
10004	1118	88/32	6	Hipponix	3	1.23	3
10004	1118	88/32	6	Isognomon	10	6.24	8
10004	1118	88/32	6	Nassarius olomea	6	2.28	3
10004	1118	88/32	6	Naticidae	1	.79	1
10004	1118	88/32	6	Nerita Theodoxus neglectus	3	.71	3
10004	1118	88/32	6	Nerita sp.	77	24.27	63
10004	1118	88/32	6	Pinctada	34	19.28	11
10004	1118	88/32	6	Strombus	5	2.99	
10004	1118	88/32	6	Tellina palatam	98	37.79	1
10004	1118	88/32	6	Trochus	2	.66	

Table D1. (cont.)

		Г			1	1	
Burial	Field	Exc.	Feature	Species	Total	Wt. g	MNI
No.	No.	Unit			No.		
	110.	Cilit			110.		
10004	1118	88/32	6	unidentifiable	8	3.42	
10004	1118	88/32	10	Sea Urchin	1	.20	
10009	1118	88/32	6	Strombus	1	.22	
I0010	1130	23/37	7	Architectonica perspectiva	1	17.66	
I0012	121			Brachidontes crebristriatus	9	.84	1
I0012	121			Pinctada	2	2.57	1
I0016	1134	34,36,37	10	Brachidontes crebristriatus	339	50.61	102
I0016	1134	34,36,37	10	Conus	5	24.99	
I0016	1134	34,36,37	10	Cymatium	8	5.43	
I0016	1134	34,36,37	10	Drupa	1	.33	1
I0016	1134	34,36,37	10	Isognomon	21	5.81	9
I0016	1134	34,36,37	10	Nassarius olomea	2	.72	1
I0016	1134	34,36,37	10	Naticidae	2	1.89	2
I0016	1134	34,36,37	10	Nerita Theodoxus neglectus	3	1.21	3
I0016	1134	34,36,37	10	Nerita picea	3	1.03	1
I0016	1134	34,36,37	10	Nerita sp.	50	15.38	46
I0016	1134	34,36,37	10	Pinctada	24	6.78	3
I0016	1134	34,36,37	10	Sea Urchin	12	2.32	
I0016	1134	34,36,37	10	Strombus	2	1.01	
I0016	1134	34,36,37	10	Tellina palatam	118	47.67	4
I0016	1134	34,36,37	10	Trochus	2	1.35	
I0016	1134	34,36,37	10	unidentifiable	12	6.65	
I0016/17	1139	36	10	Brachidontes crebristriatus	29	3.58	8
I0016/17	1139	36	10	Hipponix	1	.31	1
I0016/17	1139	36	10	Nerita Theodoxus?	2	.74	2
I0016/17	1139	36	10	Pinctada	3	1.64	1
10016/17	1139	36	10	Sea Urchin	1	.02	
10016/17	1139	36	10	Tellina palatam	9	2.39	1
I0016/17	1139	36	10	too small		8.44	
		ļ	ļ		<u> </u>		

Table D2. Shells Recovered from the Block II burials.

Burial No.	Field No.	Exc. Unit	Feature	Species	Total No.	Wt. g	MNI
Isolate			200	Nerita	1	.42	1
Isolate			200	Nerita	1	.44	1
Isolate	2259		200	Brachidontes crebristriatus	1	.12	
Isolate	2259		200	unidentifiable	1	.68	
Isolate	2254		200	Sea Urchin	1	.15	
10005	2287	84-106	213A	??	?	?	?
10005	2290	106/84	213A	Cypraea	i	2.97	1
10005	2290	106/84	213A	Tellina palatam	1	.69	
10005	2290	106/84	213A	unidentifiable	1	1.01	
10005	2291	106/84	213B	Isognomon	1	1.12	1
10005	2291	106/84	213B	unidentifiable	1	.02	
10005	2293	84-106	213	Brachidontes crebristriatus	15	.75	
10005	2293	84-106	213	Isognomon	3	.44	1
10005	2293	84-106	213	Naticidae	1	1.88	
10005	2293	84-106	213	Nerita	1	.15	
10005	2293	84-106	213	Nerita	7	1.36	4
10005	2293	84-106	213	Operculum	1	.13	1
10005	2293	84-106	213	Sea Urchin	1	.05	
10005	2293	84-106	213	Tellina palatam	27	9.28	1
10005	2293	84-106	213	too small		2.9	
10006	2278	44	204	Brachidontes crebristriatus	18	.61	1
10006	2278	44	204	Isognomon	1	.13	1
10006	2278	44	204	Nerita	2	.14	2
10006	2278	44	204	Sea Urchin	1	.01	
10006	2278	44	204	Tellina palatam	8	1.82	
10006	2278	44	204	Trochus	2	.20	
10006	2278	44	204	too small		1.72	
10007	2298	45	210	unidentifiable	3	.18	
10006/7	2299	45	210	Brachidontes crebristriatus	14	.64	2
10006/7	2299	45	210	Isognomon	1	.05	
10006/7	2299	45	210	Nerita	4	.44	
10006/7	2299	45	210	Sea Urchin	1	.02	
10006/7	2299	45	210	Tellina palatam	6	1.85	
10006/7	2299	45	210	too small		3.95	
10006/7	2299	45	210	unidentifiable	6	.46	
10008	2295	22	215	Brachidontes crebristriatus	16	.92	
10008	2295	22	215	Naticidae	1	.68	1
10008	2295	22	215	Nerita	2	1.06	
I0008	2295	22 50	215	too small Brachidontes crebristriatus	74	.34	6
I0013 I0013	177 177	50	214 214	Conus	2	4.04	O
I0013	177	50	214	Isognomon	4	2.88 .71	2
I0013	177	50	214	Nerita	15	2.78	9
I0013	177	50	214	Pinctada	6	2.78	3
I0013	177	50	214	Sea Urchin	7	.28	3
I0013	177	50	214	Tellina palatam	27	4.99	1
I0013	177	50	214	too small	21	15.02	1
I0013	177	50	214	unidentifiable	2	3.13	
I0013	2215	50	214	Conus	1	1.85	
10013	2309	50	214	Brachidontes crebristriatus	11	.54	1
I0013	2309	50	214	Sea Urchin	1	.11	-
	====				1		

Table D2. (cont.).

Burial No.	Field No.	Exc. Unit	Feature	Species	Total No.	Wt. g	MNI
110.	INO.	Unit			NO.		
I0013	2309	50	214	Tellina palatam	3	.32	
I0013	2309	50	214	too small		.55	
I0013	2311	50	214	Brachidontes crebristriatus	12	1.11	2
I0013	2311	50	214	Nassarius olomea	1	.10	
I0013	2311	50	214	Nerita	9	1.77	5
I0013	2311	50	214	Sea Urchin	1	.09	
I0013	2311	50	214	Trochus	1	.49	
I0013	2311	50	214	too small		8.65	
I0013	2316	50	214	Brachidontes crebristriatus	24	.63	
I0013	2316	50	214	Isognomon	1	.07	
I0013	2316	50	214	Nerita	1	.45	
I0013	2316	50	214	Pinctada	1	.10	
I0013	2316	50	214	Sea Urchin	3	.16	
I0013	2316	50	214	Tellina palatam	5	.44	
I0013	2316	50	214	unidentifiable		.32	
I0014	100		211	Brachidontes crebristriatus	14	1.17	2
I0014	100		211	Cymatium	1		
I0014	100		211	Hipponix	1	.07	
I0014	100		211	Isognomon	2	.40	1
I0014	100		211	Nerita	10	1.43	3
I0014	100		211	Tellina palatam	12	1.79	
I0014	100		211	too small		6.12	
I0014	100		211	unidentifiable	5	2.86	
I0014	2325	46	211	Brachidontes crebristriatus	7	.67	
I0014	2325	46	211	Hipponix	1	.38	1
I0014	2325	46	211	Nerita	2	.52	2
I0014	2325	46	211	Pinctada	1	.11	
I0014	2325	46	211	Sea Urchin	1	.02	
I0014	2325	46	211	Tellina palatam	4	.65	
I0014	2325	46	211	too small		3.38	
I0014	2325	46	211	unidentifiable	4	.65	
I0014	2336	Pit 7		Brachidontes crebristriatus	39	6.2	14
I0014	2336	Pit 7		Conus	1	47.11	1
I0014	2336	Pit 7		Conus	14	38.3	2
I0014	2336	Pit 7		Crepidula	1	.14	
I0014	2336	Pit 7		Cypraea	1	.64	
I0014	2336	Pit 7		Hipponix	1	.33	1
I0014	2336	Pit 7		Isognomon	4	.65	3
I0014	2336	Pit 7		Naticidae	1	.60	1
I0014	2336	Pit 7		Nerita Theodoxus neglectus	3	1.23	3
I0014	2336	Pit 7		Nerita picea	7	2.7	6
I0014	2336	Pit 7		Nerita sp.	22	8.83	20
I0014	2336	Pit 7		Operculum	2	1.36	2
10014	2336	Pit 7		Sea Urchin	1	.20	
I0014	233	Pit 7		Strombus	4	1.13	
I0014	2336	Pit 7		Tellina palatam	74	30.88	5
I0014	2336	Pit 7		Trochus	2	.63	
10014	2336	Pit 7		unidentifiable	4	1.72	
I0015	2321	108	208	Brachidontes crebristriatus	8	.33	
I0015	2321	108	208	Nerita	2	.30	1
I0015	2321	108	208	Tellina palatam	4	.63	
10015	2321	108	208	too small		1.24	
10015	2321	108	208	unidentifiable	1	.09	

APPENDIX E:

ISOLATED HUMAN BONE AND TEETH FROM THE MARIN TOWER SITE

Table E1. Isolated Human Bone and Teeth.

Excavation Unit(s)	Field Catalog #	Description of Isolated Human Skeletal and Dental Remains			
(Test Trench 6)	79	backfill: long limb bone shaft fragment (human?)			
(Test Trench 6)	148	proximal end of left tibia and miscellaneous shaft fragments			
28	3090	maxillary left lateral incisor			
32	1059	miscellaneous bone fragments including one proximal and middle hand phalanges			
32	1068	Fe. 2: proximal end of a hand proximal phalanx			
33	1130	Fe. 7: miscellaneous human bone			
35	1018	maxillary premolar sorted from 1/4"			
36	1068	Fe. 2: fetal long limb bone shaft fragments; may go with I0012, but I0012 is embedded in soil matrix			
37	1068	Fe. 2: right patella, hand proximal phalanx, radial midshaft			
43	2252	Fe. 212: tiny bone (shaft?) fragment			
43	2269	Fe. 212: a few long limb bone fragments and miscellaneous bone fragments			
70, 73, 95	1073	1 deciduous canine, 1 hand phalanx, 1 (human?) tooth crown fragment			
71, 73	1075	1 left first metatarsal, 1 metatarsal shaft, 1 (third?) cuneiform, 2 rib fragments, vertebral rim, 1 (human?) cranial fragment			
84		(human?) long limb bone shaft fragment			
89	1068-A	Fe. 2: two metacarpal shafts and one bone fragment			
94	1016	mandibular lateral incisor			
97		(human?) long limb bone shaft fragment			
104	2115	a few small bone fragments including shaft and rib fragments			
109	2255	Fe. 207: maxillary fragments, two teeth, long limb bone fragments			
112	2276	Fe. 209: small fragments of long limb bone			
114	220	hand distal phalanx			
115		Fe. 202: long limb bone shaft fragments			
117		miscellaneous bone fragments (formerly "I0001")			
147	2260	Fe. 218: left fifth metatarsal			
unprovenienced	1098	1 maxillary right central incisor			
unprovenienced	1122	Subadult os coxae, metacarpal(?) shaft, thoracic vertebral arch, miscellaneous fragments			
unprovenienced		Possible human scaphoid fragment			
unprovenienced		rib head			